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ABSTRACT

This monograph examines the effectiveness of university-level audioconference courses and distance education in Alaska. It discusses some of the problems of distance education and examines different perspectives on audioconferences. Teachers and students, both Native American and non-Native, offer their opinions on audioconferencing as an educational method. Factors such as climate, geography, efficiency of the postal system, the university support network, and telecommunications facilities often influence students' distance-education experience. The negative effects of such factors may cause students to drop out of audioconference courses or delay their completion. Differences between audioconferencing and in-person instruction touch upon many aspects of higher education including course scheduling, learning and teaching strategies, teaching styles, materials, equipment, and facilitators. Students and teachers have different opinions of the two educational approaches. Other factors coming into play are students' learning environment, institutional support, course evaluation, the audio channel used, and students' hearing problems. The ability to communicate effectively during an audioconference and to correct miscommunication is vital. Miscommunication can occur between student and teacher, among students, or between students and the university. Making courses relevant for students of different ethnic and cultural backgrounds is also important. Negative features of audioconferencing work against one of the goals of the off-campus program, which is to empower rural students to take control of their own education. Forty-four references are cited. Appendices to this document include lists of strategies for audioconference teaching and administration, and a description of a cross-cultural distance-education project using interactive multimedia. (TES)

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UNIVERSITY OF ALASKA

Distance Education in Rural Alaska

An Overview of Teaching and Learning Practices in Audioconference Courses

Barry M. Sponder

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An Overview of Teaching and Learning Practices in Audioconference Courses

Barry M. Sponder

University of Alaska • 1990

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Introduction

In recent years postsecondary institutions have increasingly turned to distance education to serve a variety of students previously unable to benefit from conventional on-campus instruction. In an era of declining resources for public education, colleges and universities have been under pressure to produce more for less and still provide educational programs to off-campus students (Keegan, 1986).

The University of Alaska's three major academic units, the University of Alaska Fairbanks, the University of Alaska Anchorage, and the University of Alaska Southeast, have been pressured to provide distance education to sparsely populated regions of the state. Approximately twelve percent of rural students served by the university are Alaska Natives who want to continue their education but prefer not to give up their traditional lifestyles and move to university campuses situated in large cities (Alaska Federation of Natives, 1989). For an Alaska Native, attendance at an urban campus often means loneliness and cultural alienation. Traditional thinking in Alaska Native cultures discourages the absence from family and community required by on-campus study. Approximately ninety percent of the Native students who attend urban campuses return home without a degree, and some find themselves deeply in debt (Alaska Federation of Natives, 1989).

Recognizing the need to increase Native students' chances for success, the university's three major academic units have responded with off-campus programs for Native students and other rural residents. The Native village environment, however, is not without its own set of problems.

> Indeed, in recent years, the pace of economic, social and cultural change in Native villages has been so rapid and the change so profound that many Natives have been overwhelmed by a world not of their making—a world of conflicting values and increasingly limited economic opportunity. For many Natives, the sense of personal, familial and cultural identity that is a prerequisite to healthy and productive life is being lost in a haze of alcohol-induced despair that not infrequently results in violence perpetrated upon self and family. (Alaska Federation of Natives, 1989, p. 12)

Organizations such as the Alaska Federation of Natives (AFN), Tanana Valley Chiefs (TVC), and the Association of Village Council Presidents (AVCP) have called for additional instructional services to help alleviate well-documented problems of violence, chronic alcoholism, and high unemployment that result, in part, from a history of conflict with the dominant culture (Collier, Jr., 1973; Scollon & Scollon, 1980a). Many people see access to educational programs as an opportunity to help break the cycle of devastation that has overtaken the majority of Native villages.

While several off-campus programs and rural education centers were created in response to Native concerns, many non-Native residents have used distance education courses to further their education. An audioconference class delivered over the telephone can reach across Alaska's vast landscape to include both Native and non-Native students. The effectiveness of audioconference courses is the focus of this monograph.

An Overview of Distance Education

Distance education takes place when teachers and students are in different locations. Current distance education practices have their historical antecedents in the correspondence study programs of the early twentieth century. While correspondence courses are generally held in low regard (Almeda, 1985; Feasley, 1982, 1985), technologically-assisted distance education systems are becoming increasingly popular.

Distance education systems employ a wide range of technologies including the computer, radio, television, telephone, audiotape, videotape, videodisc, and print-based courses. The configuration of a distance education system depends on the mission and resources of the educational institution. Individuals receiving instruction through various mediating technologies are usually referred to as distance learners, off-campus students, or nontraditional learners. The common characteristic that all distance learners share is a geographical separation from the origin of instruction.

Off-campus students face various logistical difficulties seldom considered by those on campus. Traditional resources such as libraries, study halls, tutors, bookstores, information centers,

support groups, and guidance counselors are usually not available. The home environment may be an impediment to effective study. Distance learners often do not have a quiet place to study at home or in the community. They usually have little opportunity to interact with other students, and their isolation can inhibit their motivation to learn (Kahl & Cropley, 1986). For communication with their instructor they rely on the mail or the telephone, which are affected by weather and geography. "Distance learners . . . are often handicapped because they are blocked from one another. Distance, time, custom, values, lack of skill can all conspire to keep students from forming their own academic community" (Ehrmann, 1986, p. 24).

In the traditional classroom, on the other hand, students' activities are guided by face-to-face, multichannel communication with teachers and other students. Teachers function as managers of the classroom environment and also act as significant external motivators of student activity. They generally set the learning agenda and monitor learning progress in a variety of ways, giving students timely feedback and support. Students in a traditional classroom form a readily identifiable group in which the rules of the interaction and participation are well known. School-specific patterns of socialization, leadership, individual behavior, and group behavior are well learned by the time students are ready to attend college because they have been socialized as traditional public school students.

Audioconferencing

One popular mode of distance education is audioconferencing, the use of a telephone system to bring together three or more people at two or more locations. The availability of telephones at almost any locale, combined with the relatively inexpensive cost of the telephone, and the familiarity of the technology make audioconferencing an attractive instructional system when choosing among distance education alternatives. In addition to voice contact, telephone lines can be used to support other technologies such as computers, videodisc players, television, and facsimile transmission equipment (see Figure 1).

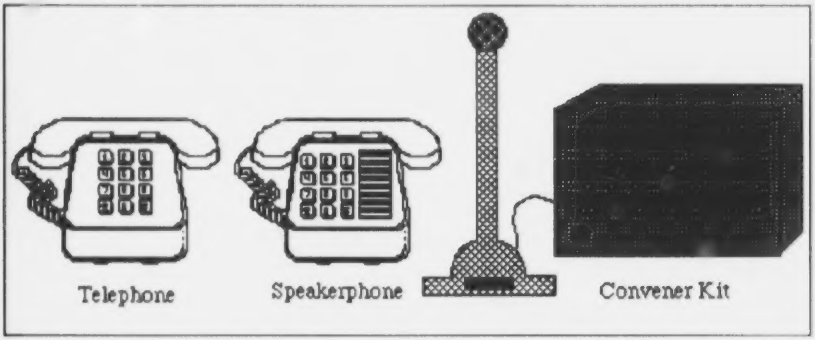

Figure 1. *Audioconference equipment available to rural Alaskan students.*

Audioconferencing in Alaska

In Alaska, the LearnAlaska Telecommunications Network was established in 1980 to provide satellite-based television and audio instructional support for all Alaskans. By 1984, nearly 12,000 students had taken over 600 courses, with ninety-five

percent of the classes using audioconferences despite frequent telephone-related technical problems that resulted from the state's remote geography and harsh climate (Benning, 1985). Most telecommunications equipment is developed and tested to work in sophisticated technological environments where support services are easily available, such as in large urban areas. Rural communities usually do not have as easy access to support services. Although the network was discontinued in 1986, the University of Alaska's commitment to offer audioconference courses continued. The university's branch campuses were created to serve different geographical regions of the state, and they became centers for delivering audioconference instruction along with offering a limited number of on-campus courses. Other classes originated from a variety of locations, wherever a teacher was situated. Resources were no longer available to place large numbers of village-based instructors into the field, and by 1988, distance education via audioconferencing and correspondence study became the dominant mode for delivering college courses to off-campus students in rural Alaska.

Distance Learners

In general, distance learners differ in several respects from students in traditional face-to-face classes. Distance learners are older than their on-campus counterparts and are more likely to have had significant gaps in their educational careers. They are usually employed and are returning to school only as part-time students. They are also likely to be raising families (Kahl & Cropley, 1986; Holmberg, 1982).

Distance learners are usually required to make adjustments in thinking and social behavior patterns established over years of traditional public schooling. For example, a student who is accustomed to learning through visual cues or through nonverbal communication may be at a disadvantage in an audioconference unless highly motivated to adapt to the new environment. Students from Native cultures, who rely on learning through observation and practice, often find that their previous learning behavior is inappropriate for distance education classes. The rules for verbal interaction in distance education classes are different from face-to-face instruction because participants usually do not see each other and the class dialogue is subject to the limits of the technology in use (Keegan, 1986; Rekkedal, 1983).

Because distance students are operating in a nontraditional learning environment they are challenged to learn through a variety of symbol systems. For example, students who learn best through observation and visual cues may have to learn significant amounts of material from a computer, an audiotape, or an audioconference. The adjustment is a difficult one for many students. Salomon (1979, 1981) argues that one of the goals of education should be to build students' ability to learn through a variety of methods. He states that "the most essential contextual differences among media . . . are their modes of gathering, packaging and presenting information." (Salomon, 1981, p. 243).

The dynamics of distance education force students to assume greater responsibility for their learning and require more independent activity than traditional classes. Capable distance learners have been shown to exhibit an awareness of their own

learning behavior because "the successful student must maintain his/her own level of active involvement through systematic interaction with the prescribed course of study and must depend for staying power on his/her intrinsic motivational capacity" (Atman, 1987, p. 15).

Alaskan audioconference students also have to deal with a technological pause in speech, caused by the telecommunications medium as it transmits and receives signals via satellite. This technologically induced delay can further confound the communication process. A speaker who is accustomed to a one-or two-second pause may wait three or four seconds before speaking again and still end up dominating a conversation. Demonstrations in Alaska have shown that the pause resulting from satellite communications can be as long as three seconds. By the time students have heard and thought about a question, the teacher may already be speaking again.

The Off-Campus Student Population

Worldwide, an increasing number of students are choosing to enroll in nontraditional or off-campus programs (Keegan, 1986). In interior Alaska, for example, rural residents comprise nearly fifteen percent of the student enrollment of the University of Alaska Fairbanks. Almost eight percent of the on-campus population is Alaska Native; however, in western Alaska, Natives make up over forty percent of the student population (Gaylord, Frank, Overton, Herb, & Brown, 1988).

Native students enrolled in distance classes are often placed in learning environments even further removed from their traditional culture than the surroundings of the public school classroom. Patterns of speech and communication can be noticeably different between Native and non-Native cultural groups, and usually people from the minority culture are required to make adjustments (Collier, Jr., 1973; Scollon & Scollon, 1980a, 1980b). Pause patterns, the time gap between taking turns in a conversation, can differ markedly between ethnic groups. Alaska Natives characteristically pause between sentences for a significantly longer interval than non-Natives, and often are prevented from participating during a verbal exchange, as the non-Native assumes there is no response and continues speaking (Scollon & Scollon, 1980b). Interethnic dialogue becomes western monologue.

Cross-cultural differences in language and communication may be exacerbated by the unusually high rate of hearing loss among Alaska Natives. One major source, otitis media or inner ear infection, is a condition found frequently among Alaska Eskimos. Davis and Silverman (cited in Pulliam, 1988) report that the rate of severe otitis media (SOM) for Eskimos is the highest in any cultural group in the United States. As many as sixty percent of the Native males and fifteen percent of the Native females living in the Bush have lost some or all of their hearing (Pulliam, 1988). A partial loss of hearing can not only severely retard the language development of children but can also affect adult learners in college. Even in a normal setting, a Yup'ik Eskimo student might

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have trouble relating to everything that a non-Native teacher says because of cultural and experiential differences. Given the frequent noise problems that are endemic to arctic telecommunications and the higher than usual occurrence of hearing impairment in Yup'iks, audioconferencing alone can only be an interim solution to a more technologically diverse distance delivery system (Sponder & Schall, 1990).

Problems of Distance Education in Alaska

The Alaska Commission of Postsecondary Education concluded its 1985 report on the condition of higher education in the state by declaring that "it is ironic that, although Alaska has been recognized as a forerunner in educational information technology, telecommunications in the state is still in its infancy" (Shaffer et al., 1985). The commission's four-year plan for revamping higher education in Alaska was the first undertaken by the state because previously there was "simply not enough available information about the postsecondary community in Alaska. This was especially true for the University of Alaska" (Shaffer et al., 1985, p. 1). Many distance educators in other programs have noted a similar trend; off-campus instruction is expanding without an adequate understanding of what is transpiring away from the instructional site. These educators stress the need for a broader research base than is currently available (Eiserman & Williams, 1986; Holmberg, 1982; Coldeway, 1982; Becker, 1978; Hiltz & Turoff, 1978; Sponder, 1990). The University of Alaska still lacks a

comprehensive knowledge base making it difficult to systematically improve distance education programs.

Under the assumption that motivated students will learn regardless of the medium of instruction (Schramm, 1973), educational institutions such as the University of Alaska have been pushing forward, combining technology with education to deliver college courses to off-campus students. Willis (1989), in a discussion of the university's distance delivery problems such as logistics, technical standards, and territorial issues, observed that the University of Alaska suffers from "a short institutional memory" (p.1), and has a pattern of seeking solutions to problems with little or no systematic assessment of institutional needs.

While the rate of funding for higher education has decreased since 1985, the University of Alaska is expanding its program of postsecondary distance education to rural areas of the state to meet an increasing demand for services; much of this effort is being undertaken without an adequate understanding of the complex nature of the audioconference in a cross-cultural environment. As the number of courses increases, most distance education classes will be comprised of students from diverse subcultures living in areas of Alaska in which far-away teachers are ignorant of local conditions. Because the cultural and social differences between Native students and non-Native teachers have been shown to be of great significance (Collier, Jr., 1973; Kleinfeld, 1974; Barnhardt, 1982; Scollon & Scollon, 1980a; Lipka, 1989), we need to know what effect, if any, these differences have on the outcomes of distance education.

A Study of Audio-conference Courses in Western Alaska

To learn more about the factors contributing to the success or failure of students enrolled in audioconference classes a research study of students in several distance education courses was conducted during the 1987–1988 school year (Sponder, 1990). The study focused on the audioconference experience from the participants' perspective.

The methodology used was based on *natural inquiry* (Lincoln & Guba, 1985) and included both structured and unstructured interviews with audioconference participants and teachers and distance education coordinators plus the monitoring of an audioconference course. Additional research data were collected from sources available within the university system.

The initial phase of the study was a literature review that identified common attributes of distance delivery systems worldwide, and led to the formation of the preliminary interview questions for audioconference participants. The use of frequently researched characteristics for the initial thrust of the study enabled the Alaska experience to be viewed within the broad continuum of existing distance education programs. The research data indicates the following:

- The overwhelming majority of students are grateful to have the option of audioconferencing, although they would prefer in-person instruction.

- Students enroll in audioconference courses because they have few other options.

- Students usually prefer at least one audioconference a week for each course they take.

- Many students who are reluctant to speak during an on-campus course feel freer to participate during an audioconference.

- Faculty who are usually successful teaching in person are not necessarily effective instructing an audioconference course.

- The lack of student support systems is a primary cause of student attrition.

- An excessive number of students fail to complete distance education courses on time.

- Students prefer tightly structured classes with many opportunities for participation.

- Little systematic sharing of resources exists among audioconference teachers.

- The audio channel is unreliable for clear, noiseless communication.

- Miscommunication problems are worsened by the audioconference process itself.

- Distributing materials to all rural villages in a timely manner is difficult.

- Paying attention to cross-cultural communication in audioconference courses is extremely difficult.

- Some students have hearing problems that interfere with their audioconference learning experiences.

- The amount of available resources in rural villages, including on-site tutors, affects the learning process.

- Both students and teachers prefer materials that are specifically designed for off-campus instruction.

- Most students believe that audioconference courses cover the same amount of curriculum as an on-campus courses; **most teachers disagree**.

- A teacher's instructional style is often dictated by the course curriculum.

- Neither teachers nor students attempt to formally integrate ideas and assignments from different audioconference courses.

- Teachers make few attempts to encourage student autonomy during distance education classes.

- It is difficult to foster interaction between students at different locations.

- It is difficult but critical for teachers to relate instruction to the students' cultural and environmental context.

Perspectives on the Audioconference Experience

Why People Enroll in Audioconference Courses

Students. The 1986 consolidation of Alaska's community colleges with the state's four-year institutions has greatly affected rural education programs. Because the university can no longer offer college courses taught by part-time instructors in rural communities, most rural residents are left with the choices of leaving the Bush, taking audioconference courses, enrolling in correspondence study, or not going to college. Ms. E., a non-Native student living in a large coastal village, explains her choice this way:

> I take audioconference courses because they are better than correspondence courses, even though I may be alone. I have no other choice since I am married and work full-time. I think audioconference courses are much better because we have deadlines. With correspondence courses I just follow my laziness and put stuff aside. I don't really have a choice.

Correspondence study for college credit has been a distance delivery option in Alaska since the early 1970s. These courses are an important source of postsecondary education for a small population of rural Alaskans who prefer to learn independently with only minimum guidance from a teacher. However, a majority of rural students are reluctant to earn college credits this way because of the difficulties of self-paced instruction, the discomfort of studying alone, and the lack of timely feedback from a teacher. Many audioconference students who have previously taken correspondence courses do not want to repeat the experience, except as a last resort. Ms. I. declares, "no feedback from the instructor, no one helped me get motivated, no one else in the class, . . . no more correspondence courses!"

Most students acknowledge that by living in rural Alaska they have to forego many of the conveniences of urban life. Most non-Native residents are from the Lower 48 states, and many people who are already accustomed to rural life find that conditions in the Bush are more difficult than they anticipated. One woman living in a predominantly Native village feels that she is residing in another country. Audioconferencing helps her cope with village life.

> It is really difficult to explain to someone who doesn't live here what it is like. Your language is spoken in the school but not too much in the community. There are no places to go to get away for a while, and if there is trouble with anyone in the village everyone knows all about it. I am from a small town in the Lower 48, but at least there you could drive to the big city. Here you are stuck. It's like living in the third world. That's why I appreciate the audioconference courses. I like the contact with the outside and I want to get a degree while I'm living here.

Another student, Ms. B., laments that while she appreciates audioconference courses she is not totally satisfied with them. "Nothing can replace the personal contact of being in a class with an instructor. As long as my husband is working here, and not Outside, I will take audioconference courses." Several other non-Native students stress the limited options of rural Alaska compared to those available Outside and they too are thankful for the opportunity to take audioconference courses.

Native students, on the other hand, do not view living in the Bush as a burden since Alaska is their ancestral home, central to their family life and their cultural identity. They do not perceive village life as a hardship the way that outsiders often do.

However, like non-Native residents, Alaska Native students are attracted to audioconference courses primarily because of their convenience. Native students appreciate the opportunity to stay at home with their families, participate in traditional cultural activities, and still be able to take college courses. Ms. C., a Native student living in a coastal Alaskan village on the Bering Sea, likes the freedom that audioconferencing offers.

> It [audioconferencing] has allowed me to continue my education and stay with my family. I am free to go berry picking in the day time and still go to college in the evening. I can't just leave and go to university to get a degree. What would my husband and family do?

Her sentiments are shared by other Native students who note that by taking college courses in the village they can raise their children in their own culture. Ms. L., a single parent, adds that "I want my kids to speak their own language and know where they come from. If I go Outside they may forget who they are."

Many rural students live near the state highway system but are still too far away from urban areas to attend on-campus classes. Several of them are reluctant to take audioconference courses, but they too have little choice. Ms. K., a non-Native student residing in a rural community on the highway system, is disappointed with her educational choices.

> I'd rather take the course here in town, face-to-face, instead of by audioconferencing. They usually offer some regular courses here but not this one. You wonder what they [course schedulers] are thinking about? Audioconferencing is slow, boring, and too much like correspondence to be of much use to me.

Most students, Native and non-Native, emphasize that taking audioconference courses will eventually lead to a degree. Ms. E., a health worker living in a large coastal town, has participated in several job-related, audioconference seminars offered by the university, and has just begun to work toward a business degree.

> The only courses I've taken here are always work-related and were during my work time, although I got credit for it. They are trainings and seminars and things like that. We were able to get credit for [them]. So I've gone from taking practically no courses at all to taking a full load. If I do this for two more years I will earn my B.A. degree.

The cost of an audioconference course is the same as on-campus course and most of the students feel that the price is reasonable. All of the telephone charges, including collect calls to the instructor, are paid for by the university. Some students, however, emphasize that for people living on a subsistence economy, $105 or more for a three-credit course is a lot of money. When the high cost of materials is factored in, a single audioconference

course represents a large investment in time and money. One woman explains her dilemma as follows:

> I am the only one working in my family since my children go to school and my husband . . . hunts for food. I only get paid every two weeks and I couldn't pay for my books or my tuition until way after the class started. It is hard to take the class that way but I want to get my degree.

While people have their own reasons for enrolling in audioconference classes, the sobering realities of rural Alaska such as geography, climate, and culture make distance education virtually the only option for a majority of off-campus college students. Students are usually aware of the trade-offs they make by living in a rural village and they consider audioconferencing, as Mr. S. puts it, "the next best thing to being there."

Teachers. Teachers are aware that most people enroll in audioconference courses because their educational choices are limited when compared to on-campus students. Instructors who teach both on-and off-campus courses see differences between the two student populations. Mr. Y., like many other teachers, views off-campus students as adult learners who are usually more motivated than their on-campus counterparts. "They're older and they bring more life-experience to their courses."

While high motivation is recognized as a positive attribute in the majority of off-campus students, several teachers feel strongly about the lack of basic English and math skills of many of the same students. A few teachers with rural public school experience cite the well-known, low-achievement levels of village high schools as a major problem for postsecondary distance education

programs. Ms. Z. voices a common complaint of university teachers who feel that "it is obvious that rural pub[illegible] schools have not been doing their job because so many students do not have entry-level college skills." She notes that when village high school graduates take college courses, they are "usually in need of developmental education." Some distance educators also see the convenience of audioconferencing as a drawback because so many students who take off-campus courses lack many of the prerequisite skills to succeed in college. However, another teacher questions this assumption. "If you limited course enrollment only to students who are working at the college level, then in certain regions you'd only have about ten percent of your population eligible to take college courses. That is unacceptable."

Ms. V., an Alaska Native teacher, feels that many Native students have additional motivation to enroll in distance education courses because "many students are working women who are supporting their families. These courses are helping them right now in their jobs." She cautions that the developmental skill deficiencies which are usually mentioned by non-Native teachers are often a result of cultural differences, poor public school experiences, or even a lack of effort on the part of college teachers to get to know their students.

> It takes a lot of hard work to make these courses good for Native students. We are used to different ways of learning than *gussaks* [non-Natives]. Lots of Natives are not accustomed to the academic life . . . how to write papers and take tests. When they get to college they get stuck in developmental courses. I am so tired of always having to adjust to the system. The system should try to adjust to us, too.

A few teachers candidly acknowledge that distance education is desirable because audioconference courses help to keep them employed. Audioconferencing has expanded class enrollments and created a new market for off-campus college courses; thus teachers as well as students have a strong personal interest in the success of the distance education program.

Why Students Drop Out of Audioconference Courses

Students cite many reasons for not completing audioconference courses. Usually the first two weeks of a course are critical for deciding whether to continue or to drop out. Factors such as climate, geography, the efficiency of the postal system, the university support network, and the telecommunications facilities often have a negative impact on students' distance education experience, and often lead to student attrition.

Occasionally, an advising mistake causes a student to enroll in a class when he or she lacks either the basic skills or the necessary prerequisite courses. Frequently the mistake is discovered in time so that the student can drop out and register for an appropriate course. Sometimes, however, mistakes are uncovered too late in the semester for a student to enroll in another course or receive a refund for the course text.

Students often sign up for distance education courses without realizing the enormous amount of study time required. Audioconference teachers routinely emphasize, in class and in print, that students need to spend at least two hours outside of class

engaged in course-related activities for each audioconference contact hour. When students take more than one audioconference class they often have more demands on their time than they can handle.

Several of the support systems that urban residents take for granted such as convenient health facilities, easy access to transportation, and uninterrupted communications are usually unavailable for Bush students. Many students who drop out point to job-related or family-related problems. Mr. U. describes his situation as follows:

> Things got to be too much for me. I registered for three courses but then my little girl . . . was in an accident and I had to take her to Anchorage. She was okay but then I had to travel for my job and I never did catch up in my classes. I think I will start again next year but with only one class.

A number of students cite late-arriving materials as the reason they drop out of courses. Some villages have only twice weekly mail delivery while other communities are unable to receive mail during seasonal periods of bad weather or until frozen rivers thaw. One student complains that people living in urban areas do not empathize enough with the harsh conditions of village life.

> My books were outrageously late! They arrived during the third week after the actual start of the course and there's no way one could fully benefit from the course if they have to cram at the beginning of a course. I called the school several times but they said there was nothing they could do. Therefore I was unable to go on with the course.

Other students, whose materials do arrive on time, say they do not have the money to pay the required C.O.D. charges. A few people have to wait two weeks or more until payday for enough money to purchase their course materials. Every so often students drop a course and fail to notify the local postmaster. Packets of materials often languish unclaimed in the post office while late-registering students have no books at all, which in turn can cause some of them to drop courses.

The process of phoning into the audioconference bridge is occasionally confusing for new students, perhaps because they do not know what to expect. One person kept dialing the wrong number and finally gave up and dropped the course. The student tried to reach an in-state 800 number, but was unsuccessful, even with the help of the telephone operator.

> I could not get through on the telephone three times in a row. First time I tried the line stayed busy. Second time the operator said "no phone number like that," and third time the operator said I was two numbers short. Maybe I try again spring semester.

The student was missing part of the phone number, but no one bothered to find out why this person failed to phone in for the first class. Some institutions regularly call students who fail to phone in during the first week, but others do not. The audioconference teacher is usually the one to initiate follow-up inquiries on missing students.

Materials Distribution

The presemester distribution of course materials is the first step in the instructional process. When the process goes well students are usually prepared for their courses. When students fail to receive their materials on time, they often have trouble catching up with the rest of the class for a week or more. Ms. D. chides that she does not like to suffer because "the university couldn't hire somebody good to get the damn books out on time." She recalls her frustration and surprise at receiving all of her materials after the courses started.

> Well, I received all of the materials for the three classes, but they all came in late. All of them. . . . I called the bookstore and they sent me two copies of one text and forgot to send the others. I couldn't believe it. I didn't get the English books till after the class started and I registered a month in advance. I was the only one not to get the books on time. . . . That's the problem. That's what I don't like about audioconference courses. No one really seems to care.

Late-arriving materials are often the result of a combination of factors including the last-minute submission of handouts for duplication by instructors, little or no preparation time given to teachers to develop audioconference materials, the late arrival of textbooks from publishing houses, underproduction of course materials, slow mail service, and late student registration. The majority of students receive their materials on time, although inevitably each semester some do not.

One option for the speedy delivery of materials is an early mailing of course packets to village facilitators who in turn distribute them as needed. Another possible solution is for rural campuses to distribute materials within their own region.

Why Students Fail to Complete Courses on Time

An often unnoticed aspect of the distance delivery system is the number of students who settle for incomplete grades—they do not drop courses, but fail to complete enough assigned work to earn credits. Students have up to a year to finish an incomplete course. The Center for Field Programs reports the percentage of off-campus students receiving incomplete grades averaged nearly fifty percent between 1985–1987. The percentage of students completing unfinished courses after one year decreased from 90.6% in 1985 to 71.5% in 1987 (Stricks, 1988). Statistics for audioconference courses show a higher completion rate than university correspondence courses, where approximately fifty percent of the off-campus students fail to earn credit after one year. However, in comparison, less than one percent of UAF on-campus students received incomplete grades during the 1987 school year (Gaylord et al., 1988).

Several teachers give "I" grades for reasons other than dire personal emergencies. Ms. Z., a field coordinator, feels that some teachers want to give students more time to finish courses than the semester allows. "There are all sorts of distractions in the villages, and lots of teachers want to bend over backwards to help students succeed." Some teachers extend semester deadlines when the mail system proves unreliable, or when the weather causes problems for students. Mr. Y. finds it unrealistic to enforce a semester deadline because students in a few rural villages often do not receive mail for a month or more during the winter. He gives them all incomplete grades and another month to finish up.

Another teacher, Mr. W., is less sympathetic. He finds that when he makes it convenient for students to receive an "I" they will ease up and often fail to complete the course. He feels that strict guidelines and teacher-enforced discipline are essential for off-campus students because they lack the external motivation that comes with in-person contact with the teacher.

> I don't give incompletes, except for death, accident, or injury. If a student has to travel on business, or attend a wedding, I don't [give an incomplete]. They either drop the course or finish. Some drop, some finish, some fail. I try to design my courses so that students can realistically finish up on time, though inevitably some don't.

Students give many reasons for not clearing an incomplete grade within a year. Sometimes they wait until the year is almost up before they try to complete their unfinished assignments, but are often unable to rekindle the necessary enthusiasm to finish. A few people try to get more time to complete the missing work, but university policy prohibits further extensions. Some students discontinue their education temporarily by dropping out of school with the intention of returning in the future. Ms. K. returned two years later to find that she had to take a course over again to receive credit. "I just didn't realize that I'd lose it [credit]. I thought dropping out would give me some time to catch up with my life." Another student lost interest in her unfinished courses until it was too late.

> I didn't do enough to finish the classes. At the time I wanted to develop new skills because I is studying [for] a new job. I did what I needed to do, but I was kind of disappointed anyway. I was surprised to see the "F" grades on my transcript. No one likes to fail.

While the audioconference system has expanded to provide more courses to a wider audience, many students are unable to complete existing courses.

Audioconferencing Versus In-Person Instruction

Students. Audioconference courses cover many subject areas and students are usually satisfied with their learning experiences. Only a few students are unsatisfied with the quality of the off-campus courses, though no one states a preference for audioconferencing over traditional in-person instruction. Most students believe that an audioconference course covers the same amount of material as on-campus courses because they count for the same amount of college credits.

A few students, however, believe that the university should make more of an effort to fund part-time instructors in rural villages. Ms. C. has been a distance education student for several years but she still prefers having teachers in her village.

> I used to enjoy the village classes. The teachers came from the high school or the elementary school and there were usually three or four students in the class. We all knew each other and could help each other before and after the class. Even the teacher would be around to help us. Audio classes are okay, but you really don't spend a lot of time on instruction, and asking for help on the telephone is hard when you can't see the teacher. I usually have a hard time speaking on the telephone.

Some people feel that their geographical isolation makes them more responsible as students, and they, like Ms. Q., view audioconferencing as a form of self-study.

> It's okay with me [audioconferencing]. It's not the same as sitting in a classroom with a teacher, but hey, I don't knock it. It is a little bit difficult to concentrate on a voice. I think that most of what you learn is by how much you apply yourself to the material. She [the teacher] is just sort of a guide I guess. What you get out of a class is really up to you.

Ms. A. agreed with her. "Audio classes are small so you have to speak up, you have to do a lot of the work on your own. You have to be mature."

Students readily identify other aspects of audioconferencing that make it resemble on-campus instruction. They appreciate a teacher's efforts to develop class camaraderie through biography–sharing assignments and collaborative homework. Most students like to use instructional media such as videotapes or audiotapes, which give them additional ways of learning besides audioconferences and print-based material. Ms. E. believes that having a classmate in the village makes the audioconference more like an on-campus course than anything else.

> I feel lucky this semester because I have two other students here with me. I can't tell you how satisfying it is to share the experience with somebody else who you can look at and laugh with. We laugh a lot. I feel sorry for the other students out there who have no one with them. I hate it when I'm alone with just the [speaker] box to look at.

While most students are satisfied with the system, some are not as enthusiastic. Ms. P. has taken several audioconference courses and is quick to differentiate between the good and the not-so-good courses.

> I've taken over twenty audioconference courses. When you are really interested in a course you learn a lot, if you aren't interested you don't learn that much. The good courses are the ones where the teacher motivates me. You can tell if a teacher thinks the course is just a correspondence course with talking. Those are courses I don't like.

Audioconferencing has become a popular way to augment programs when small branch campuses do not have a qualified teacher available to offer specific on-campus courses. However, students living in rural towns with small university campuses are not as enthusiastic about audioconferencing as village residents. Ms. N. feels that, "I take these courses because I have no choice, but I have never learned as much as I have from classes on campus. It is so ridiculous to have us take audioconference courses when there are enough students on campus for a real class." She and several other students indicate a preference for in-person instruction whenever possible, because they see themselves as on-campus students and want the benefits of personal contact with their teachers.

Many students believe that the number of audioconferences is directly proportional to course satisfaction. Since there is no uniform formula for audioconference contact time among the university's branch campuses, students often have to contend with different course lengths and many starting and ending dates. Ms. C. has experienced a variety of audioconference formats.

> I've taken all sorts of audio classes. The ones that meet three times a semester, or once every two or three weeks are a joke. There is so much information given during class that you can't really ask questions or do anything else but listen. Weekly or twice weekly classes are much better because you feel like you are in the right rhythm . . . and you feel more like a student in a college class, not like someone on the outside.

While most students are generally positive about audioconference courses they also have an attitude of resignation. Ms. E. notes, "What difference would it make if I didn't think audioconference

courses are as good as regular courses? I feel we are lucky to get anything."

Teachers. Educators are usually more critical of audioconference courses than students. Several teachers acknowledge that they were never trained to teach over the telephone and initially found it difficult to adapt to the new format. However, after giving it a try many faculty consider audioconferencing to be a reasonable substitute for in-person instruction, though many still have reservations about its comparability to traditional on-campus courses. Mr. W., a math teacher, is concerned that less material is being covered than for the same on-campus courses.

> You just can't cover as much content, but what we can cover we do as well as possible, so what they learned will be good. There is no way to visually demonstrate things to students with the technology we have in place now, so the on-campus blackboard is better than anything that I audioconference with.

Mr. W. also believes that the system does not equate with on-campus instruction. "Students like it because otherwise they would not have anything. In a sense it is a disservice to students if they get all of their courses by audioconference." Ms. V. goes further by advocating that rural students "should spend at least a year on campus to get their degree. They need the interaction with other students."

Mr. Y. finds many differences between on-campus and off-campus sections of a science course he regularly teaches.

> I used the same text for the audioconference course as the one on campus. The off-campus students are able to get through only about two-thirds of the book. We just have to go slower. Anytime you are dealing with science material you need visual pictures. Over the

> audioconference you have to paint a verbal picture, and even when you paint a picture it is still not the same [as in-person instruction]. I wasn't able to correct students' misconceptions in the audioconference class as much as for students on campus.

While most teachers are more critical of audioconferencing than their students, they treat students sympathetically and try to make the distance education experience as close to an on-campus course as they can. Ms. X., however, believes that most students are unaware of the differences in quality between the audioconferencing and in-person instruction. "They don't know what they don't know. Students think audioconferencing is the same as on-campus courses, but it isn't." Mr. X. points out that rural school districts also have reservations about too much audioconferencing in teacher training programs. Several districts are reluctant to hire distance-trained teachers and go so far as to require student teachers to work in their larger urban schools. This policy is to insure that new teachers will have the necessary skills to succeed in the district's smaller and often more demanding village schools.

Because most audioconference teachers try to approximate the on-campus experience as best they can, little theoretical discussion takes place among distance educators about the model of instruction they are using. Consequently, most teachers use the on-campus model as the ideal learning situation without much question. Mr. Y. speaks for most teachers when he states that, "We know in the best of all possible worlds the best instruction is when teachers and students are working together in person."

Some teachers differentiate between classes that are subject-matter oriented versus courses that involve skill development. Audioconferencing seems better-suited for subjects that stress factual material such as history or anthropology. Courses that require skill development and learning procedures, such as mathematics or education methods courses, often prove more troublesome to teach because of the visual limitations of the medium. Mr. W. asks rhetorically, "How can you evaluate whether someone can perform this operation without seeing him or her do it? How can you give someone any immediate visual or written feedback?"

A few teachers stress that courses which depend heavily upon prior knowledge, such as biology, chemistry, and psychology, are not as effective as on-campus courses because many rural students do not have the necessary prerequisite knowledge from high school. Additionally, audioconference students do not have the facilities, such as a library or computer center, or the personal contact with a teacher to help them make up for their lack of background information. Teachers even have difficulty assessing students' prerequisite knowledge and adjusting instruction accordingly. Course materials and procedures have to be developed and distributed well in advance of the first class, and incorporating prior knowledge assessment and curriculum flexibility into any off-campus course is a challenge.

Some teachers are concerned about the cultural bias of the materials used in many audioconference classes, which is also a dilemma for on-campus courses. The majority of distance delivery

teachers are non-Native, and the issues, priorities, and concerns of the dominant culture tend to monopolize most of the curriculum. Ms.V. feels that when teachers are aware of the cross-cultural possibilities of a course they can use the audioconference format to help balance students' experience.

> A lot can be done in the audioconference to make sure it's an equal learning situation for all students, not just for *gussaks* [non-Natives]. Certain non-Native students like to talk. It's usually not an opinion, it's just like filling the air. In a regular classroom they just go on and on and it is really difficult to get Native students to participate. In audioconferences you can keep them equal by giving them both opportunities to speak. It's good because you can control some of that hot air and encourage others to participate.

Ms. V. finds another benefit of audioconferencing versus in-person instruction for some Alaska Native students, "I think that Native students are more comfortable in audioconference classes because no teacher is looking straight at them in the eye."

The concern for student achievement prompts teachers to try alternative instructional methods that they might not use for in-person instruction. Some teachers rely more on materials such as videotapes, audiotapes, extra texts, supplementary readings, and computer programs to present a majority of the subject matter. They feel that the audio channel alone is a poor medium for presenting new course material and they continually search for well-designed instructional media for their courses, although their efforts are often fruitless.

A few teachers admit that sometimes major differences occur between courses offered by different university campuses. The titles and course numbers are the same, yet the curriculum is often significantly different. This is not an uncommon occurrence

in distance education programs worldwide. In Alaska, for example, part of the problem stems from the 1987 university consolidation merging separately accredited community colleges with four-year institutions. In some cases the differences between course offerings is no more than a teacher's preference for a text or a focus on favorite topics within the curriculum. In other cases the differences between courses are substantial. The university encourages contact between off-campus and on-campus personnel and has created cross-campus departments to insure a common curriculum. However, resource sharing and course development usually takes place informally and there is no way to insure that, for example, an Ed. 201 *Orientation to Education* class taught at different university campuses will cover the same curriculum.

Course Scheduling

Students. Audioconference courses meet from as little as three times a semester to as many as two a week. Conferences are held in the evenings for logistical purposes, since most students are occupied in the daytime, and many of the audioconference facilities are located in public buildings which are not available until after 4:00 P.M. Additionally, telephone rates are cheaper in the evening which help make audioconferencing an affordable educational alternative.

While the university has no uniform requirement for audioconference contact time among its campuses, both students and teachers prefer more audioconferencing. Ms. E. compares two different audioconference classes in the following way:

> I like audioconferencing each week because you have that contact with other students and the teacher. I'd still rather be in the same room with them, but weekly contact is much better than having classes only three times a semester. That offers you no guidance at all, even though you can call the teacher when you want to, I like feeling part of a class. I like hearing what the other students think. Without the contact you sort of feel lost because there is no one to tell you how you are doing.

Some distance education courses use the on-campus formula of 800 minutes of contact time for each credit hour earned. This works out to three hours and twenty minutes of audioconferencing a week for a twelve week semester, and slightly less over fourteen weeks. For the most part, when students have more contact with a teacher and other students they feel better about their courses and their learning experiences. However, a point of diminishing returns is quickly reached for some people who feel they have too much contact. Students who take more than one class a semester can be audioconferencing for almost three hours a night, four nights a week. Sometimes audioconferences overlap for a few minutes causing students to miss a portion of one class. When audioconferences are scheduled back to back, students may have little time to prepare dinner or eat with their families. Many busy students prefer that courses meet only one night a week giving them time to catch up on their other responsibilities.

People consistently speak of the trade-offs they have to make to succeed as audioconference students. The time required to complete homework assignments is sometimes overwhelming and many students feel the stress of trying to keep up with their weekly assignments. If students are enrolled full-time, taking nine credits for some programs and twelve for others, they are expected to

spend at least eighteen to twenty-four hours a week outside of class engaging in course-related activities. For people working full-time, the burden can be overwhelming. Ms. E. counts herself lucky that she has a supportive family.

> I couldn't succeed without their support. My kids are getting a kick out of it. They think it's neat that mom is doing homework and my husband is very supportive of the idea and it's working out fine. Everyone does their part to help me or else I wouldn't have the time to take four audioconference courses.

Another student, Ms. G., is also taking a full course load and working during the day. She volunteers that "I'm looking forward to a break. I haven't been able to knit a sock, crochet, or sit down and have a quiet cup of tea."

Some teachers count the time that students spend watching videos as bona fide contact time, while others do not. Many students appreciate the flexibility that videos afford them and often view course tapes over the weekend. Sometimes, however, a teacher requires that students watch instructional tapes the same day as the audioconference because of the concern that students won't remember as much from an earlier viewing.

Teachers. Teachers usually have some input into how often their audioconference courses will meet. They know how much student contact time they will have well in advance of a course, so they can design their instructional plan and homework assignments accordingly. Most teachers want to schedule as many audioconferences as possible because they feel that students need their direction. Mr. W., however, does not require students to attend his math classes. "If they know how to do the work and can

pass the tests, then the decision to call into the audioconference is theirs." Most students like the option he gives them, although only one person does not attend audioconferences.

Course scheduling can also be a problem for distance educators. Most teachers are responsible for both on-campus and off-campus courses, and sometimes class meetings are spread throughout the day or into the evening. Mr. Y. has a 9:00 A.M. class on campus, other on-campus responsibilities during the day, and an audioconference class which finishes at 9:00 P.M. for two nights a week. "It sure breaks up your day and it makes it a little hard to pace yourself." Teachers with two audioconference classes and two on-campus courses end up with a very taxing teaching schedule. Occasionally a teacher will audioconference from his or her own home, though it is not a practice encouraged by any university campus.

Audioconference Learning Strategies

Students. Audioconference courses often cause students to acquire new learning behaviors for the audio-only environment. Many students find that some of the appropriate behaviors they learn in public school, such as note-taking and the use of nonverbal cues to respond to a teacher, are not as important during an audioconference course.

Note-taking in audioconference classes often has a different purpose than in a traditional class. Mr. R. finds that "taking notes helps me from drifting in and out. It is easy to get lost in an audioconference without some reference point." Other students

mention that without cues from an instructor they have difficulty knowing what to write down. True, concentrating on the teacher's voice is easier without having to pay attention to a flip chart, an overhead projector, or a blackboard, yet some students do not take any notes during audioconferences. One student candidly admits, "There is nobody watching you during an audioconference so the pressure is off to look like you are hanging on [the teacher's] every word." Other students report that because so little new material is ever presented during an audioconference they do not concentrate on writing anything down. All of the curriculum information is available in their course materials and some students just jot down notes in the margins of their textbooks.

All audioconference students have to make adjustments to their nonverbal behavior. They can no longer communicate with a teacher through a smile, a frown, a puzzled look, raise their eyebrows, or nod their heads in agreement because usually no one is present to see their gesture. Students learn to respond to the teacher and to their classmates in new ways, though it is often difficult to respond at all. A few students phone a teacher after class to ask questions or to discuss curriculum issues. Other students respond only when they are called upon in class. Some students phone people at other sites because they are collaborating with classmates on homework projects. Students say that they enjoy the additional contact with their peers and want more of that kind of activity in other classes, although they do not like spending money on long-distance calls.

Many students point out that their learning habits are contingent on such factors as other audioconference courses, their

family and work responsibilities, their physical stamina, their previous experiences, and their teachers. Some students prepare in advance for audioconferences, which enables them to participate in class and ask questions that go beyond the surface level of the curriculum. A few students use the audioconferences to help pace themselves through the course assignments. Ms. F. finds that "you have to do the work as quickly as you can. Never let assignments hang over your head or you get a headache." A few students complain that they frequently have to use the dictionary and a course glossary, if available, so that the teacher's jargon will be familiar to them.

Many students also feel that they need to be assertive in using the phone to make sure they get the help they need. Aggressiveness does not come easy to some students and the teacher often must make an extra effort to reach bewildered students. Some teachers even call students at home to check on their progress.

Teachers. Most audioconference teachers view successful off-campus students as adult learners who are motivated self-starters. Teachers recognize that providing opportunities for interaction in an audioconference class is difficult and many educators design their courses with the independent learner in mind. The learning behaviors that most teachers consider significant are self-motivation strategies, integrating course concepts with other college coursework, and making the curriculum meaningful by linking it to personal experiences.

For most teachers specific motivational strategies seem to be

as difficult to employ in distance education as they are in on-campus instruction, because as Keller (1983) points out, "our understanding of how to arouse and maintain student interest in learning lags far behind our knowledge of how to facilitate learning once the student has the desire to achieve." Most instructors count on the students' desire to learn and their degree-seeking goal to keep them motivated to succeed in audioconference courses. Students who are unable to maintain their own motivation usually have the most trouble in audioconference classes.

Another successful learning strategy is the practice of relating knowledge and procedures from one course to another. Mr. Y. encourages this practice, which he feels "must be one of the latter stages of Bloom's Taxonomy." He believes that language arts courses, such as writing and literature, are appropriate links to his science courses since both reflective and expressive skills "are the basis of communication. Understanding science concepts requires background knowledge, which involves the use of reading and thinking skills." He is particularly encouraged when Native students link information from his science courses to materials they studied in other classes such as anthropology, history, or literature. One problem with this integrating strategy is that students often think of the practice as cheating. Few students are told that assignments from one class can be used in another, and they feel uncomfortable when a teacher encourages them to use work from other classes. One student believes "it's like you are trying to get out of work or something. I see why it's good, but I still feel a little guilty."

Ms. V. encourages students to relate anthropological con-

cepts to their own culture. She feels that for a course to be relevant students need to be able to personalize the information they learn. She believes that when learning concepts, students need to provide many of their own examples and nonexamples. "Unless they [students] are able to define things from their own experience it will often be useless to them."

Audioconference Teaching Techniques

The conditions of instruction are often different for each audioconference class, and some teachers adapt their teaching methods to fit the changing educational environment, while others do not. Students usually have strong feelings about how teachers moderate an audioconference, although they often have trouble identifying specific strategies that teachers use. Overall, with only a few exceptions, students are satisfied with the quality of audioconference instruction.

Students. Most students enjoy activities that encourage them to participate in class. Courses such as writing, history, anthropology, and education theory that focus largely on factual knowledge and concept-building rely heavily on class discussion. Ms. Q., like many others, enjoys participating in her English class. "I like the class sessions where everyone is involved. I want to know what others are thinking." She describes the most effective teachers she has as "good discussion leaders. The good ones talk a bit, then start a class discussion, then ask questions." She contrasts good teachers with an inexperienced science teacher, who

does little but answer questions over the audioconference. "Each teleconference . . . you just ask questions on material that you don't understand. Basically I have to learn it all myself." Another student describes the same science class as "playing twenty questions. You never know whether you have learned something because there is no applying what you studied." Students expect the teacher to be in charge, and are dismayed when little or no attempt is made to instruct them.

When teachers show forethought and organization, students generally respond well. Ms. E. describes her freshman English teacher as a good model for other teachers.

> She is real organized. At the beginning of the class we all shared something we wrote. Then she'd ask us if we had any questions about our homework and did an excellent job of answering them. She wasn't too wordy and used good examples. After that she lectured a bit and I liked that because it helped to make all the stuff we learned fit together. Next, she'd go around and ask questions, and then we had a chance to read more of our work.

Some teachers use in-class activities to keep students interested during an audioconference. Students are then called on to share their answers with the class, creating a controlled interaction that seems to work for many people, especially those reluctant to speak. Writing activities are the most common interactive assignments that teachers use because students can still work on a group project while phoning in from different locations.

Students in classes that require skill development or cognitive strategies, such as mathematics or science courses, usually prefer less class interaction and more instruction by the teacher. They do not want to hear a classmate's opinion about the difficulty

of mathematical operations, they want to learn how to perform the procedure. These courses tend to rely more on self-checking materials for feedback. Students still appreciate some interactivity but it is less important to them than to students in classes which do not stress problem-solving skills.

On-campus mathematics courses require a visual component; teachers demonstrate algorithmic operations and work through examples while students observe the procedures. Audioconference students, however, have to rely on the teacher's verbal skills and the course materials to compensate for the lack of visual instruction. Ms. E. compliments her math teacher on his teaching techniques.

> Our instructor explains everything real well. You also have a workbook and some tapes. The materials are good, and he takes you over them step-by step . . . I tried taking a math course last year—the same type of math. The course was just a book and a teacher talking, and the teacher was not nearly as good as this one.

Ms. Q. agrees with the assessment of her math teacher.

> He is an excellent teacher, and I find algebra hard. He is excellent at explaining things. You would think that over the audioconference algebra would be impossible, but he is so good at explaining the theory behind the math concept. The other students in my class think he's great, too.

Regardless of the instructional methods they prefer, students have little or no input into the techniques that audioconference teachers use. Teachers are regarded as experts, and their instructional practices are communications to respond to, not to modify.

Teachers. Audioconference teaching strategies are affected by a number of conditions that vary from class to class and semester to semester, causing teachers to adjust their instructional methods accordingly. Teachers never know where students will be calling from and what educational resources they have available. Teachers are never certain beforehand about the cultural backgrounds of their students, their prior experiences, or their entry-level skills. When courses have no prerequisites, many educators are reluctant to set basic-skill requirements, because they worry that such requirements will eliminate a large population of Native students, for whom English is often a second language.

A few audioconference teachers receive additional pay to develop course materials over the summer vacation, but the majority of teachers do not have any more time for curriculum development than they have for on-campus courses. Most teachers, however, believe that audioconference courses take more effort to develop and teach than in-person courses, and students' learning is more difficult to evaluate. Ms. X. describes her attitude and the way she supports student activity.

> Actually one thing that works for me is not being judgmental and being conscious of other people's point of view . . . which is more difficult in distance delivery. You can't see body language, but you do get a sense of who people are and where they are coming from. You have to avoid the stance of the teacher as the bearer of light and truth. I always try to get students to work through problems inductively by giving them a lot of activities in class, so everybody's thinking process is legitimized.

Other teachers mention that they are influenced by the writing-across-the-curriculum movement popularized by the "Alaska Writing Project" and the Kuskokwim Campus' "Institute for Language and Thought." Ms. X., however, cautions that students need to learn that "they don't get a letter grade for everything they do or writing becomes just another chore."

Teachers also use other strategies to foster student participation. Ms. V. encourages students work together on assignments, both in and out of class. She believes that by building a class spirit though shared assignments, biography sketches, and personal examples, students will feel better about the class, the coursework, and themselves.

Many teachers feel that having a sense of humor is a great asset because they want students to enjoy the audioconference. One teacher tries to motivate her classes by "doing lots of fun things like having contests, challenges, and giving students a variety of activities because with this curriculum, you need to take the dryness out of it."

Most audioconference teachers have at one time or another used outside resource people to add another perspective to their classes and to perk up student interest. The opportunity to draw upon experienced professionals is an acknowledged advantage of audioconferencing, and some teachers carry the practice over to their on-campus classes. One teacher makes it a practice for students to speak with the author of their course textbook. Most audioconference teachers, however, admit that they fail to use enough outside resource people in their classes.

Teachers of science or math courses find that concept-building exercises and techniques that reinforce on skill-development are essential to their courses. Concept formation requires the use of many examples to illustrate ideas, and Mr. Y. believes that his previous experience in rural Alaska helps him formulate meaningful examples for students.

> You have to teach them beginning concepts, things they should have learned in high school, before you teach them the advanced ones. I use as many local examples as I can find to help students understand these concepts. I have to be very patient and present information slowly and then do a lot of reinforcement.

Mr. W. uses the text and study guide materials as the basis of his math classes. He finds that making his classes interactive, the advice given by seasoned audioconference teachers, does not work for him. "I found out that you can't have the same kind of interactive math classes as you do in anthropology." He listens to other audioconference classes from an adjoining office but realizes that he can not employ the same teaching methods. "You can't wait for students to discover these mathematical processes inductively." Mr. W spends a lot of time trying to locate appropriate texts for his audioconference classes, but it is difficult to find materials to fit a rural Alaskan audience. He uses his own student manual to accompany the course text.

> The student manual is in essence my lesson plan, and along with the textbook and my set of notes, we discuss the information. In another math class we use some videos also. It is essential to have good self-checking materials for students because I can't always be there for them at the moment they need an explanation.

The teacher finds that students learn math best by carefully going over a series of known examples before they try novel problems. Unfortunately, some students have difficulty keeping up with the self-study regimen at home without the constant nip of the teacher at their heels.

Some audioconference classes originate from sites where both students and teachers are present. Many teachers prefer to sit in another room and teach the course, in effect making all of the sites equal. Mr W. believes that an audioconference is "a lot like giving a performance. I concentrate better when no one is in the room." He explains why he likes to be alone.

> I decided not to go in the classroom with students because it is more equitable. Each student is equal and you can't show favoritism. If you are with students in the room there are all forms of nonverbal communications. Students on line are aware of what is going on and they don't like it. They feel it is discriminating against them and they will tell you.

Some teachers prefer having students in the same room when they audioconference. Mr. Y. likes giving all of the extra attention he can to his on-campus students and finds that looking at the students in front of him helps his teaching.

> I keep all of my materials in front of me, and by having students with me in the audioconference room I am able to keep them in focus more and keep their attention. They are under my eye. I don't think that it's wrong that they get a bit more out of the class.

A summary of successful instructional strategies are as follows:

- Scripting lessons in advance of the class allows a teacher to concentrate on student learning and class management instead of what he or she is going to say next.

- Using short writing assignments as in-class activities and asking students to share their work during the audioconference are good strategies for eliciting student participation.

- Requiring students to summarize the main points of the audioconference class in a learning log and responding to students' logs on a regular basis creates a good feedback loop between the teacher and the individual students.

- Encouraging students to keep journals helps them to monitor their own learning behavior.

- Changing the pace of a class through the use of short games, information quizzes, and poetry helps keep the class participants interested.

- Calling people who fail to phone in during the first week of class and occasionally calling students during the semester to check on their progress demonstrates a teacher's concern for the students.

- Encouraging students to share their course information with family and friends and inviting family members to occasionally participate in classes helps to combat the isolation of distance education courses.

- Giving shared assignments to students from different villages helps to foster class camaraderie.

- Asking people to provide short biographical sketches for dissemination to the rest of the class allows students to get to know each other as more than a voice on the audioconference.

- Using outside experts in audioconference classes helps to maintain student motivation and provides additional resource people to interact with students.

- Audioconferencing in a different room from their on-site students helps teachers to concentrate on their instructional performance for off-campus students. Some teachers disagree with this strategy.

Whatever methods teachers employ, they usually find it difficult to manage the off-campus learning environment. ***Because distance education requires new ways of approaching the teaching task, techniques which take advantage of the audioconference situation tend to be more effective than trying to simulate a traditional on-campus lecture .***

Audioconference Equipment

At some audioconference sites the equipment is stored and maintained by site facilitators, but in other villages the equipment is under the care of the high school principal. Students are often responsible for setting up their own audioconference equipment, and when problems arise they either have to try to fix the equipment or send it back to the university for repair. Few students enjoy audioconferencing from a telephone because holding a phone and listening for an hour and a half can be tiring, however, calling in from home is usually an acceptable trade off for most students who use a telephone.

Not unexpectedly, many students report that they use more than one kind of telecommunications equipment during a semester. People who travel for work-related or family-related reasons often call in from other locations which is one of the advantages of audioconferencing. Teachers who travel within the state or to locations outside of Alaska are still able to teach their classes. Some teachers have even called in from an airport pay phone.

Audioconference Facilitators

While some students have on-site facilitators to help set up audioconference equipment and to act as a liaison with the university, most students do not have a university representative in their village. Facilitators occasionally act as course tutors, and students who have on-site facilitators feel fortunate to have the additional assistance. Students without on-site facilitators often express the desire for more on-site help.

Materials

Most teachers use the on-campus version of a course when they choose audioconferencing materials. It is often difficult to create a new set of print materials for audioconference classes, so teachers usually modify their on-campus handouts for distance delivery. While many teachers expect students to learn the bulk of the curriculum from the course text and other printed matter the majority of students want to be taught the way they are used to in public school. They realize that they need a lot of direction from their teachers to complete their assignments and they do not have the time to guess what the teacher wants them to do. When the teacher's directions are unclear students often wait until the next class meeting to get clarification.

Using standard college texts can sometimes cause problems. Students who are not reading at the college level often experience frustration over difficult required reading and they report spending more time on their classwork than the suggested six hours per week. However, most students say they are satisfied with their

textbooks, if not enthusiastic about them. Most audioconference courses have additional printed matter that accompanies the textbook, and students like materials such as advance organizers, information outlines, and comparison charts that summarize important information and assist them to understand the text. Some teachers also distribute articles from popular magazines about topics which are covered in class.

The class syllabus takes on added importance for off-campus students although some people admit they do not read it through if it is too long. A majority of students agree with Mr. R. that a good course syllabus is "easy to understand and read. It gives me a good indication of what will be expected of me during the course." Problems occasionally arise when scheduling conflicts force changes in class meeting times, which sometimes throws off a teacher's carefully planned assignment schedule.

Videotapes are popular with most students and only a few do not have a videotape machine at home. Some audioconference courses use prepared telecourse materials such as "The Write Course" or "The Growing Years," and many students like the flexibility that tapes give them. "I liked watching the tapes over the weekend, with my daughter," said Ms. E. "We have some good discussions too." Students also like the study guide that usually comes with a telecourse because it helps them to focus on the key points of the videos; they find it difficult to watch a video and take notes at the same time.

Some audioconference courses use movies, television programs, or teacher-made videotapes to augment instruction. Students report enjoying these materials for the same reasons they

like the prepared telecourses—the material is usually presented in an entertaining way, and students control the pace of the instructional presentation. Ms. D. finds that the videos help her in ways she did not anticipate.

> I really enjoy the videos that come with this English class. I've been real leery of taking this class anyway, and I am surprised that the videos showed me other people have trouble with writing too.

Ms. B., however, advises her teacher not to use the the English telecourse series again. "I don't like the videos, they are terrible. I told [the teacher] many times to redo the tapes or get rid of them." Sometimes students are influenced by the teacher's opinion of the materials, as in the case of Ms. F. "The instructor is always saying 'dang the video and dang the book.' He is always finding fault with the materials." She now hates them also.

A few teachers have time to make their own videotapes and they are usually well received by students. Ms. F. enjoys the videos that a teacher prepared from his own on-campus course.

> We have a good instructor. He . . . made his own videos and it was really great because we saw him and we are able to relate to him. It was a video of his class. He was sitting at his desk and talking.

Because there are only limited library resources in most villages many of the print materials that students receive are photocopied. After the start of the semester students often discover problems with the photocopied materials such as missing pages or illegible text. Commenting on a poorly copied syllabus, one student remarked that "certain papers were not copied completely. Part of the print overlapped each other, and the pages weren't in order." Some students check their materials over

thoroughly when they receive them, but most people only notice errors when they begin to do their assignments. A few students are able to receive replacement copies in time to complete their work, but others do not receive better copies until after the assignment is due. Mr. T. has had many problems with audioconferencing materials.

> The first two courses I took I couldn't read the materials. I didn't realize they forgot to Xerox the end of the article. I got to the point where I realized that I needed more information. I could have looked through each page but when you see the article you expect it to be okay.

Audioconference courses do not routinely use other instructional media such as videodisc programs and computer-assisted instruction, although some students use computers for word processing. This is not surprising since there is no standardization of computer equipment in rural villages, nor do all students have easy access to computers.

Distance educators living in rural Alaska often do not have adequate on-site library resources available for the development of audioconference courses although the university makes resources available through the main campus library. Library personnel will conduct on-line database searches and obtain resources for off-campus faculty although sufficient lead time is needed to receive materials from out of state.

Audioconference Teaching Styles

Students. For audioconference students, the most tangible manifestation of an audioconference teacher is his or her voice over the telephone. By their comments, most students prefer teachers who show many of the qualities of "supportive gadflies" (Kleinfeld, 1974). These teachers usually exhibit a personal concern for students with a demanding posture that seems to motivate people to succeed as distance learners.

Many teachers try to keep students actively engaged in learning during the audioconference. Distance learners are challenged to get to know each other without in-person contact and nonverbal cues, yet some teachers are able to create a warm and comfortable educational environment. Ms. E. likes the way her English teacher uses the audioconference to promote students' activities.

> I have to say that [she] is probably the best audioconference teacher that I have listened to so far. She knows how to talk over the phone real well so that she doesn't break up or that sort of thing. Not many people do that and it's real hard to hear them over the audioconference . . . . She makes us feel that she's interested in what we're learning and what we know, [which] makes us feel that she wants to help us. She gets us all to participate and comment on each other's work so you feel like what you have to say is important.

Some teachers demonstrate their concern for students by returning their phone calls in a timely manner, spending a lot of time on the phone with him or her, or calling students at home to check on their progress. Other audioconference teachers feel their responsibilities do not include contacting students unless they are

returning a call about a class-related problem. They feel that since they do not call on-campus students at home, they should not treat off-campus students any differently.

Kleinfeld (1974) points out that the supportive gadfly refrains from using personal criticism in the classroom since it is culturally inappropriate to single out Native students for such admonition, and most non-Native students do not appreciate the criticism either. Instead, teachers utilize more impersonal communicative techniques such as telling stories about another person's problems or using unsarcastic humor to ease a student's discomfort. Many audioconference teachers consciously avoid even indirect criticism of students, and instead speak to them after class about their problems.

A sense of humor about yourself is an asset. Ms. V. comments that, "You have to have a sense of humor and not take yourself too seriously or you'll go crazy." Mr. W. finds that many funny situations arise naturally out of the audioconference format, and he has learned to enjoy them.

Another gadfly characteristic that Kleinfeld (1974) identifies is the teacher's inclination to individualize instruction as much as possible. This gives the teacher an opportunity to work with students one-on-one so that differences in vocabulary and prior experiences could be addressed. Some students appreciate hearing a teacher work individually with another student during an audioconference, and they feel they learn a lot by listening to the teacher's explanations. Other students, however, say they quickly lose interest after a moment or two and want more

activities directed at the entire class. Students are especially indignant when a teacher spends class time with a student going over assigned material which the student failed to read. The other students are given the message that it does not matter whether they do their homework or not. While students like to receive individual attention, they do not want to exchange audioconference time for correspondence courses combined with phone calls to a teacher.

Many students also appreciate a teacher's high expectations for their academic performance backed up by the willingness to help them to succeed in the course. Ms. Q. comments on the differences between a teacher who held high expectations for her and one that did not.

> The two classes that I have are just opposites. One teacher said at the beginning of the course 'I don't feel like I should give lectures because I can't see you, and I don't know if you're sitting there or if you've all left.' So that right away turned everybody off. He isn't going try to give us real attention. All he did is answer our questions over the audioconference. He was depending on the material to do the teaching. And so I was glad to hear that [the other teacher] is doing just the opposite. She is really enthused and ready to do as much as she could. She told us what she expected and she knew exactly how to deal with the audioconferences.

When Alaska Native faculty teach audioconference classes they have certain advantages because of their background and culture. Both Native and non-Native students usually like the change in teaching styles, and Native students in particular feel more comfortable. Mr. T., an Alaska Native, describes the difference between the teaching styles of Native and non-Native instructors.

> Native teachers are closer to the Native students and they think like us and they respect us. I find that if you respect your students they will respect you. My [Native] teacher is really concerned about me and helped me through the course. I kept getting my homework assignments back until I got it right . . . . *Gussak* teachers, well some are good and some are not so good, and they do things differently than we do. Some of them treat you as if you are a child.

While most non-Native students appreciate the differences that Native teachers bring to the audioconference, a few students feel uncomfortable with their teaching styles. Ms. I., a non-Native student, finds that the extensive use of storytelling by a Native teacher makes it hard sometimes for her to pay attention.

> It seems like I'm taking in information mostly, and it gets tiresome to listen to the teacher talk. [The teacher] goes on and on. . . . Sometimes we do assignments in class, and I like those assignments because I'm doing something.

Most other non-Native students, however, say they are glad to approach learning from a different perspective. Ms. D. gives her view of a Native teacher she had in a previous semester.

> She gave very clear instructions and everything is well laid out. She had a very noncritical style. No criticism and lots of praise. She did tell a lot of stories but I liked that. It helped my motivation to know you always got a second chance with the work you turned in.

Other distance educators exhibit a "traditionalist" instructional style (Kleinfeld,1974). These teachers have either volunteered or been drafted to teach audioconference courses in addition to their on-campus duties. They approach distance education with a professional posture, which means concentrating on the academic curriculum while mostly ignoring the interpersonal dimension of the audioconference. Ms. N. finds that one of her teachers is too traditional for her liking.

> This teacher is really strict. I felt bad for students who asked questions. I am afraid to ask questions because I didn't want the teacher to take me apart. That's really sad. Support, that's what the teacher is there for and [the teacher] shouldn't take it personally if students don't understand instructions or something. If [the teacher] can't [communicate] when students ask questions then it's sad.

In sum, students seemed to prefer teachers who show a sense of humor, personalize instruction, and retain a noncritical yet demanding attitude towards students' work. These qualities, however, are often difficult to exhibit over the audioconference network.

Teachers. Most teachers admit that their first audioconference class is a lesson in survival, and they approached the initial course with unaccustomed nervousness. Because they have only informal training for audioconferencing, many of them try to teach their classes as if they are on-campus courses. However, most teachers eventually find that they need to adapt their teaching style to fit the audioconference format.

Ms. V. finds that she can use some of the same activities in distance education as she uses on campus, but many of the exercises lose their effectiveness without a visual component. While she adjusts her methods, she still retains her basic supportive, student-oriented style of teaching.

> Right now it is easy for me to teach an audioconference class but before it wasn't. When I first started I was nervous and I had lots of frustration without nonverbal communication. Half the message was gone. Now I've taught distance delivery for a while and I just do different things, but some are the same as I use on campus, I just do them little different [sic] over the audioconference.

Mr. Y. finds that he, too, has to make adjustments to his audioconferencing instructional style. His on-campus teaching style is presenting information to students through a combination of lectures with a heavy visual component, daily course exercises, and a lot of one-on-one tutorials. He often spends as much time helping students develop their reading and writing skills as he does on the course curriculum. He describes the differences in his on-campus and off-campus style of teaching.

> Students needed more time to integrate concepts in the audioconference class.... They have to do a lot of work on their own.... I wasn't able to work with them much individually because so much of the material was visual. When I teach on campus I have to also teach writing and we go over grammar, but off-campus I just can't do it. The biggest difference in my teaching style is the lack of feedback between me and the students.

While Mr. Y. modifies his teaching style, he still retains his supportive gadfly approach.

Many audioconference teachers find that they are facilitators of information rather than content area specialists. Since the audioconference process tends to limit the instructional capabilities of the class, teachers who do not try to cover all of the curriculum in class report less frustration and feel more relaxed during the audioconference. However, by relying more on students' homework and outside learning experiences teachers also tend to receive more written assignments that have to be graded and promptly returned. The flow of paperwork can often be overwhelming.

To view teachers' instructional styles as fixed, however, is a mistake. Many teachers are moderating audioconference classes for the first or second time, and some have not yet found a

comfortable teaching style to fit the situation. Most experienced audioconference teachers admit that they did not become comfortable with the format until they had taught one or more courses.

Assignment Turnaround Time

Students. Assignment turnaround time for audioconference classes is a function of Alaska's mail system and how long it takes a teacher to receive, respond, grade, and mail back student assignments. Many things can happen to prevent the smooth delivery of the mail including poor weather, roundabout mail routes, inconvenient post office hours, and even volcanic disturbances. While most students do not drop out of a course because of the lack of timely feedback from teachers, several students report frustration at not receiving their work back for many weeks. Ms. B. views assignment turnaround time as a reflection of how much the teacher cares about her work.

> She's the fastest I've ever seen. I've taken 24 credits of audioconference courses this year and she's the only one that seems to read the homework and send it back the same day she gets it. She always writes good comments. I'm impressed."

Ms. B. regrets that some of her other distance education teachers are not as responsive as her English teacher, and the lack of feedback from them causes her many problems.

> I started on some of my classes six weeks ago and I've gotten no feedback yet from the instructors. I haven't received back one piece of homework information and yet I got all of my assignments in on time. So I have no way of knowing how I am doing with my homework—if I'm doing a lot more than I need to do, if I'm doing it right. You know I have no idea of what is expected of me so far and I have been going to class six weeks now and I don't know if I am really understanding the material. I hope I am but I don't know.

Teachers. Some teachers maintain a strict assignment timetable for students. For example, Mr. W. requires students to send in monthly assignments complete and on time or they lose credit. He reasons that unless students have strictly enforced deadlines they will never get all of the required work mailed in. He believes that it is the only way to help students discipline themselves to complete their assignments. He returns the homework as fast as he can, but since the materials are self-checking, students at least knew if they are doing the problems correctly.

> I find that I have to be strict or some students just wouldn't be able to get their work in on time. It's too bad that each village doesn't have a computer or fax machine where students could send homework to me, and I could return it the same way. But there doesn't seem to be a high priority for that right now.

Some teachers report that the slow trickle of off-campus paperwork is difficult to deal with. They do not respond to work until they have most of the students' assignments. This further slows down the turnaround time. Without another system of information exchange besides the mail, assignment turnaround time for Alaskan distance education classes will continue to be a problem for many teachers and students.

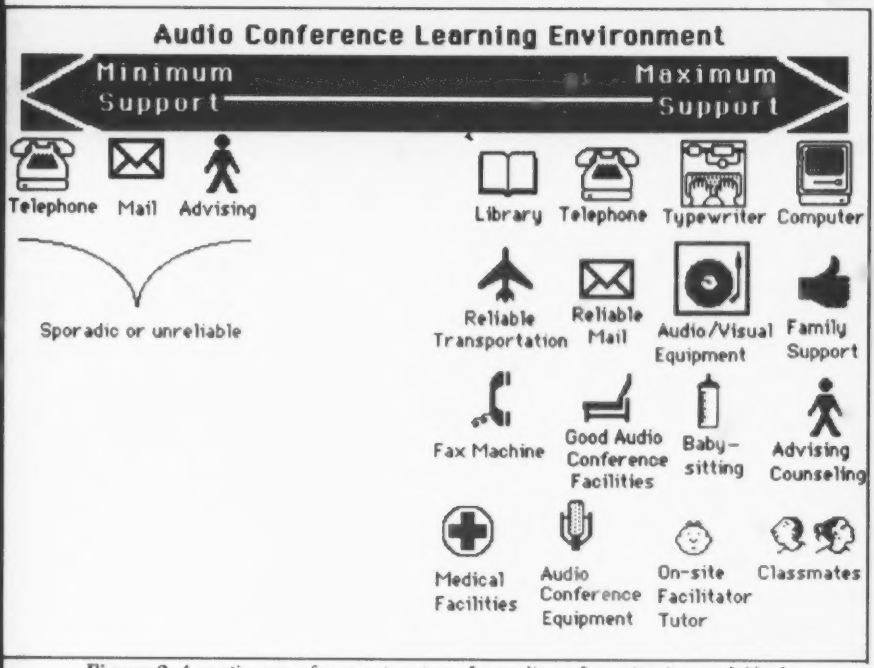

Figure 2. *A continuum of support systems for audioconferencing in rural Alaska.*

The Learning Environment

The student's learning environment is determined by a combination of factors that differ from village-to-village and often from semester-to-semester. Students who have a more supportive environment report having an easier time with off-campus courses than students with a less supportive environment. Many elements help to create a supportive environment and several of them are beyond the control of the teachers or the university. Some of the environmental conditions that affected students are as follows (see Figure 2):

- **The village where the student lives, including its geography, climate, cultural context, and location.**

- **The medical services available in the village.**

- **The availability of educational resources such as a library, computer, typewriter, videotape recorder, television, audiotape recorder, copying machine, facsimile machine, and a conference room with well-maintained audioconferencing equipment.**

Not surprisingly, many students cite the support they receive from their families as a major factor in their success or failure as distance learners.

Students often live in villages that are separated by hundreds of miles and have major climactic differences (see Figures 3 and 4). During the winter months harsh weather conditions often hamper students' learning efforts by making it difficult to move around their village and almost impossible for them to receive mail.

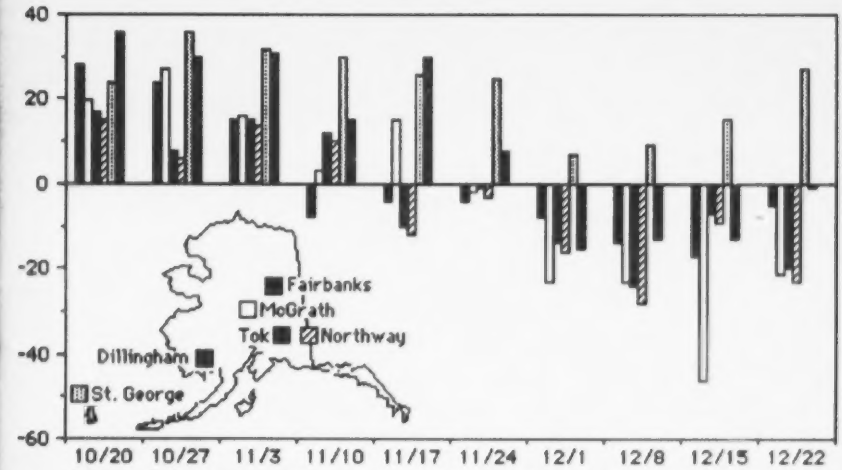

Figure 3. *Temperature patterns recorded at six audioconference sites during the fall 1987 semester. Adapted from the* Anchorage Daily News *weather map.*

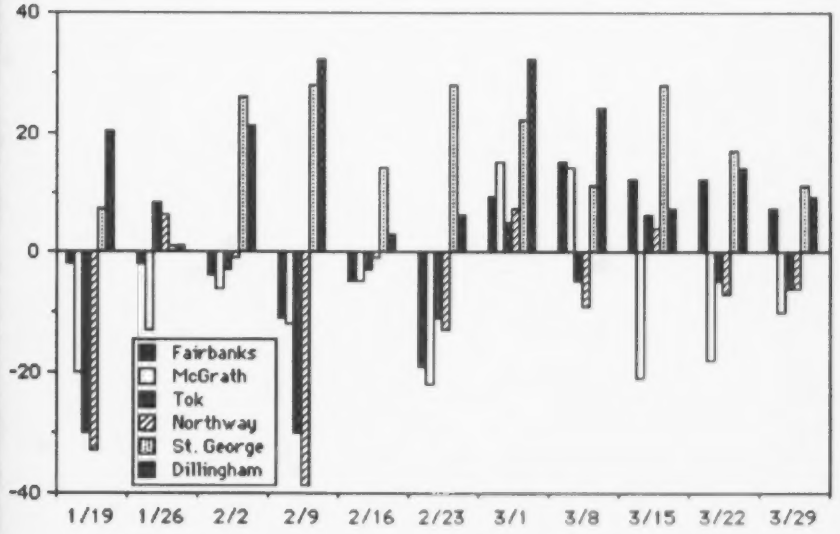

Figure 4. *Temperature patterns recorded at six audioconference sites during the spring 1988 semester. Adapted from the* Anchorage Daily News *weather map.*

Sometimes the audioconference facilities are poorly heated and students have a hard time concentrating on their classwork. At other times the extreme weather conditions affect the telecommunications equipment, preventing students from phoning in to the audioconference. Ms. L. describes her journey one evening to reach the audioconference facility at the local high school.

> It was fifty below and I was a little late for class because of cooking dinner for my family. It was really snowing and I couldn't see anything. It was a whiteout. I used the rope that leads through the village to pull myself to the high school, but halfway up the rope broke. I got to class an hour late and I was freezing. It was hard to concentrate that night.

There is a noticeable gap in learning resources available to students at different audioconference sites. Many students live in larger villages with libraries established for college studies, and students are able to take advantage of the many services that the library offers including photocopying, book ordering, and locating resource materials on microfiche. Many students use the library as a quiet place to study. Students in smaller villages, however, usually rely on the local high school library, which focuses on secondary school needs and contains few suitable resources for postsecondary courses.

Some villages have rural education centers and students are able to use resources such as a typewriter or a computer. Students in other villages have only a limited opportunity to use either type of machine unless they have their own equipment. A key environmental factor is the willingness of the school principal to let audioconference students use the school's facilities after hours. Many principals are in favor of village residents taking audiocon-

ference classes and assist students whenever they can. A few principals, however, have little use for audioconferencing and while they do not overtly refuse students permission to use the school's facilities, they do not go out of their way to help them either. One student laments her situation.

> I know that some students work at the school so they can use the library and the machines [computers and typewriters] most times. I don't work there so it's hard for me to get in there when no one else is using them.

All audioconference students have access to a telephone, although the audio quality varies among the villages. Audioconference rooms are in a student's home, at a rural education center, or in most cases located at a local high school. Students in villages which have on-site facilitators are often insulated from some of the everyday hassles that others have to contend with. Every so often a student arrives at the high school before the audioconference starts but finds the outside doors are locked. This usually happens in villages where no on-site facilitator is available to take care of the necessary preconference housekeeping procedures. A facilitator's duties include opening the building, setting up the equipment, and fixing the it when necessary.

Some of the audioconference facilities in high schools are located in closets or in areas which have poor ventilation. One student reports that her conference room is next to the high school gym, and students from that village have difficulty audioconferencing on weeknights when the gym is open to the public.

If villages lose their phone service then many students are unreachable unless the teacher contacts them over a commercial radio station that is heard their village. Bush mail is also slowed

by its circuitous route through Anchorage to reach other areas of the state. Fax machines are available in some villages, but in many cases students are not allowed to use them. Although the university pays for audioconferencing expenses, it does not subsidize faxing assignments to the teacher.

Many students are fortunate to have on-site tutors for their classes. Tutors are usually village residents who have subject area expertise, and many of them are local public school teachers. Most students, however, do not have access to a tutor and have to rely on calling their teachers for assistance. Frequently a teacher will be off-campus or traveling and unavailable to help students. Ms. E. says that the assistance her tutor gives her is invaluable. "If it isn't for the tutor I'd fail. I'm almost disregarding the instructor now and concentrating on the tutor." Other students at her site in the same class agree with her.

Audioconference students are usually older than their on-campus counterparts, and many of them have been taking courses for years. Several students are studying and working to help support their families at the same time. The amount of encouragement that students receive from their families often plays a key role in their success or failure as distance learners. Without active family support many students become despondent and eventually drop out of courses.

When a student is a single parent he or she has additional responsibilities. Single parents have to worry about childcare during audioconferences and some students have constant trouble making babysitting arrangements. Many people who audioconference alone use the opportunity to phone in from their homes rather

than from the audioconference facility. They often sit in a chair for up to an hour and a half with the phone pressed to their ears. Sometimes the background noise in the house makes it difficult for other people on line to hear, and their classmates often resent the distraction. Ms. Q. comments on a classmate's problems. "I find that her kids are not only driving her nuts, they're driving me nuts too. I wish the teacher would say something."

The student's cultural context is also an important environmental condition of distance education. The American Indian education system, under the Bureau of Indian Affairs (BIA), tried for a long time to force Natives away from their own culture (Collier, Jr., 1973). One of the most notable practices of the enculturation process was a policy to discourage the use of Native languages in the public schools, so Natives would be assimilated faster into the American mainstream. Many Native students still feel the pain and embarrassment of their school experiences. Ms. P. is like many other Native students who have suffered a loss of self-confidence through her public schooling.

> I went to school and I didn't speak any English. When I started to speak Yup'ik the teachers told me "No, don't speak Yup'ik." I didn't understand them and I laughed. Well, the teacher hit me with a ruler and I got quiet and I didn't speak in school for a whole year. It really made me feel bad and I still don't feel comfortable speaking in school today.

Alaska Native villages have as much diversity among them as non-Native communities, and a strong village tradition of local control over education and politics allows each village to develop in its own unique way. Ms. V. comments on some of the differences between villages.

> In some villages they are more traditional. They might not be familiar with how to do a term paper, or how to do research—you know the academic stuff. In traditional villages most everybody speaks our language and people are closer to their culture. In some villages people are really losing their culture because only few people speak in their own language.

The cultural context of language is important for most Native students, but not for most non-Native students who speak English as their first language. Native students have to be bilingual and work within a narrow educational framework that often fails to legitimize their linguistic and cultural experiences. Ms. F. remarks that, "Sometimes I just don't like to speak in class because I don't express myself so good in English." Ms. V. points out that the traditional Native way of learning is different from audioconferencing.

> When we learn something in the Native culture . . . it's different from audioconferencing unless the instructor gives the student a second or third or fourth chance to learn. If you don't do it right the first time in the Native culture, you do it again a second time and you do it again a third time and a fourth time until you master it. . . . It's more like long term observation. If you want to learn to cook, you watch somebody cook.

Many audioconference teachers have some cross-cultural experience in rural Alaska and have previously taught both Native and non-Native students. There are scores of potential audioconference sites for cross-regional classes, and before the semester starts teachers do not know which villages will be participating. If students register from the same region as the instructor then it is possible to quickly learn something about the students' environment. However, for cross-regional courses there is no central information source to draw from.

Institutional Support

Advising. For most distance education students their only continuing connection to the university is through a contact person acting as their academic program advisor. The role of advisor is usually filled by regional field coordinators, teachers, and in some cases a campus director. The advisor's identity depends upon factors such as the type of degree a student is pursuing and where the student lives. At some rural campuses one person acts as an advisor for hundreds of students, many of whom he or she has never met in person. Most students report that contact with an advisor usually takes place either through the mail or over the phone.

Students know that good academic advising is essential for their success as college students. They rely on their advisor to provide quick and accurate information about university courses and program changes. The advisor usually makes sure that the proper registration and financial aid forms are sent out, and he or she often assists students in filling out paperwork. Many students, like Ms. B., expressed gratitude for the quality of advising they receive. "She's the director of the university branch here. She's very helpful. She's been figuring it all out for me, what courses I need and when. I'd say we are really lucky to have someone like her looking after us." Another student comments on the same advisor by remarking that "I feel like I'm getting pretty good advice compared to what I had at a big university in the Lower 48."

Several people enrolled in special programs, such as the University of Alaska Fairbanks's Cross-Cultural Education Degree program (X-CED), like having advisors travel to their village, where they often stay with students.

> It is special when he comes out to visit and talk about my progress. I think this is the only way to do it because I would hate to have to call him all the time for advice without really knowing him or he don't know me. Everyone should have an advisor visit them at least once a year.

Other students do not have as much luck with their advisors. A few complain of unreturned phone calls, poor advice, or an advisor's lack of appreciation of the student's village environment. Ms. N., a Native student residing in a Bush community of less than two hundred, observes that only her aggressiveness leads to getting the counseling she needs.

> Last year we had an advisor that helped us. This year we have somebody new but I don't think she is very well qualified. Maybe by the end of the year she will be. This is a confusing system for a new person, so I called up the rural education center in another town to get advice on which courses to take this year. They helped me right away.

Counseling. Many of the problems of rural Alaskan villages have reached alarming proportions. Alcohol-related violence, unemployment, suicide, and cultural encroachment are significant factors affecting many Bush communities. While some support systems exist in the village to help deal with many of these problems, there is an on-going need for counselling services for distance learners. Many distance education programs provide counseling services over the telephone for off-campus students although these programs usually cannot fully replace in-person counseling.

Course Evaluation

The evaluation of cross-regional audioconference courses is conducted through the use of standardized computerized questionnaires that are distributed by the university's main campus near the end of each semester. The evaluation is accompanied by a form permitting more in-depth responses from students. Teachers, however, usually do not receive evaluation feedback until the middle of the following semester making it difficult to use the information in a timely manner.

Traditional on-campus evaluation methods are not very effective for distance education courses because these procedures are based upon large sample sizes and conventional data collection methods. Audioconference courses usually have much smaller enrollments than on-campus classes and the collection of data is hampered by the inconsistencies of the mail system. Quantitative methods such as surveys and Likert scale questionnaires are effective only if the range of students' responses is certain, and if the return rate is high. In distance education courses, however, many students fail to send in their evaluation forms, classes are too small for statistical significance, and the range of possible answers is too wide to make quantitative methods useful.

Qualitative evaluation methods such as structured and semi-structured interviews, participant observation, and case studies are often effective for assessing non-traditional courses. Qualitative methods can provide in-depth pictures of educational situations and can offer contextual information to help improve educational practices. For example, some teachers use learning

logs to communicate with students on a regular basis. After each class the students are required to write questions and a lesson summary. The teacher checks the logs for conceptual understanding of the material, provides feedback to students about their progress, and answers their questions. Teachers who use learning logs report that they get a better picture of the course from the students' perspective than from a one-shot standard evaluation form at the end of the semester. They are also able to make adjustments to the class and to their instructional styles while the course is still in progress.

The Audio Channel

One of the biggest problems with audioconferencing is its lack of a visual component. However, in addition to the visual limitations, the audio portion of audioconferencing is often a source of frustration and confusion. Mr. Y., a health aide instructor, observes that, "In many ways audioconference students are like visually impaired people." He describes audioconference students he observed.

> [People] sat in an enclosed space straining to hear voices from faraway villages. . . . Students in the village always seemed to hit the speaker or the microphone when they heard any static. They looked like hearing impaired people having problems with their hearing aids.

Students are able to name several audio difficulties that bother them. At least ten separate problems are identified. They are described as follows:

Fadeout is the tendency for the audio signal to start out clearly but gradually get weaker until no longer audible. Participants have to disconnect from the conference and call the bridge again, unless the signal fades back in.

Talkover occurs when two people speak at the same time but only one voice can be heard over the audioconference line. To prevent talkover teachers usually call on class members rather than allowing an open microphone. Talkover is also attributed to the time-delay caused by the satellite relay lag time. If two people do not pause long enough between sentences, they often talk over each other.

Cut-off happens during normal conversations when the audio signal stops and no one can be heard. Participants then disconnect from the audioconference and redial the central bridge. Another form of cut-off occurs when participants who are speaking let up on their convener button before they finish, and the other participants cannot hear the rest of the message. This frequently happens with inexperienced audioconference students.

Crackling sounds, a common form of telephone noise in Alaska, are often heard during an audioconference. Sometimes the noise is so loud that it interferes with the conference.

Intermittent sound occurs when the essence of a message is heard, but the sound goes off and on periodically. This problem is usually caused by the telecommunications equipment or by sunspots.

Background noise includes any sounds that take place at a site which are unintentionally transmitted to other audioconference sites.

Low audio makes it difficult for people at other sites to hear a person speaking. This is often caused by the telecommunications equipment, or by a participant being too far away from the microphone. Low audio also frequently occurs when students are speaking through a standard telephone.

Speaker feedback is a high-pitched noise that results from the speaker being too close to the microphone. Some conference rooms are so small that speaker feedback is a common problem which is usually corrected when participants at other sites call attention to it.

Hiss is an identifiable background noise that is caused by either ambient noise at a site or the equipment itself.

No sound, or a dead microphone, is often attributed to a village power failure, a telecommunications equipment malfunction, or improperly connected audioconference equipment.

Site-specific disturbances are problems at an identifiable audioconference site which can include any or all of the other problems listed above.

Audio noise is easy to overlook because the harsh realities of the arctic environment make the audio problems seem small in comparison. Most students and teachers tend to push on with instruction as if the audio problems are temporary nuisances and have no lasting effect. Some students, however, report that frequent audio noise disturbs them and causes many frustrations. Audio difficulties occasionally force students to miss classes, sign off early, or not participate in an audioconference. As the demand for off-campus instruction increases, the dependance on audioconferencing has grown, and the problem of audio noise has not abated.

Students' Hearing Problems

While the audio channel is a problem for almost all audioconference participants, some evidence suggests that it is more of a problem for students with a history of hearing-related illnesses. The university does not require students to have hearing tests as part of the required pre-enrollment health screening. Consequently, the number of students with hearing problems enrolled in distance education courses is unknown.

Many audioconference students have had illnesses such as otitis media in their youth, but few of them have been tested for hearing loss as an adult. One student feels that her hearing is troublesome, but she could put up with it. "I don't hear so good so I go up close and then it's not so bad." She has to put her ear next to the speaker to listen to the audioconference because the equipment does not have separate speaking/listening volume controls.

For students with a known history of hearing problems, it is difficult to isolate their physical problems from other variables including the students' cultural background, their familiarity with the material, and difficulties with the telecommunications equipment. Though hearing-related difficulties are hard to isolate, it is surprising that no attention is paid to the possibility that audioconferencing might be unsuitable for an identifiable segment of the student population, especially because a significant portion of the instruction is communicated aurally.

University Membership

The inequities in educational resources among rural Alaskan villages play a part in how people feel about themselves as university students. Students who live in towns with rural campuses or in villages with rural education centers report a strong sense of identification with the university. The institution is physically represented through a library, classrooms, on-line computer services, and full-time personnel. Ms. B. likes having access to many facilities.

> We have a lot of resources available here. The university has been very helpful in providing tutors for every single one of my courses, and they are available at any time for me. I have a good place to study because the university center is open day and night and I find myself going down there a lot. We are very lucky. I feel like the university really cares about how I do.

The majority of students, however, have no such support systems in their villages. Many students feel that the university places the needs of on-campus students over their own because of

the lack of postsecondary facilities in the Bush. The university, however, has little clout in rural villages because it does not own any facilities or educational media except for the audioconferencing equipment itself.

Patterns of Communication and Miscommunication

Few people have ever used the telephone as a formal medium of instruction before enrolling in distance education courses. Since education and communication are thought to be closely related (Bowers, 1984; Salomon, 1981), the quality of the distance education program is largely dependent upon the audioconference communication process. The ability to communicate effectively over the audioconference and the capability to correct miscommunications takes on added importance because rural college students have few alternatives to audioconference courses.

The Audioconference Class

The communication process during an audioconference is largely shaped by the telecommunications technology. Only one person at a time is able to address the class, causing many teachers and students to view the instructional process as a rigidly structured, teacher-led experience.

The primary communication patterns in an audioconference class are either messages sent between the teacher and the class sites, or exchanges between the teacher and individual students. In addition to lectures, teachers direct audioconference activities by calling on students to read, write, ask questions, or participate in class discussions. At locations with more than one student, however, the interpersonal communications are similar to those in an on-campus class. However, people who are alone at a conference site are restricted to the audio channel for sending and receiving messages, and their communication patterns are constricted by their environment and the telephone equipment. Conversations between students at different sites are uncommon because the technology does not support open microphone discussions. When people have comments for their classmates, they usually direct them through the teacher. Occasionally, the teacher encourages students at the same site to discuss an issue over the audioconference so that the rest of the class can listen.

Students in the X-CED program have more communication alternatives than the majority of distance learners because they are able to meet with some of their classmates and teachers each semester during a regional program meeting. These students, however, represent less than five percent of the total off-campus student population. The cost of bringing more than a few people together in one location is prohibitive, making it an unrealistic option to use with the majority of the off-campus student population.

The limitations of the audioconference communication process underscore the importance of the well prepared curriculum materials. Without a lot of direct and immediate feedback, and given the uncertainties of the mail system, students have to rely on the printed materials that accompany a course as their primary source of information. Neither students nor teachers have access to a very effective feedback loop because neither is able to communicate through more than one sensory channel at any given time. It is apparent that the main purpose of audioconference communication is to support the print component of the course.

Communication and Miscommunication Between Student and Teacher

Most interaction between a student and a teacher is a classic example of what Myers and Myers (1988) call an "up and down relationship" (p. 23). This pattern frequently reflects a one-way message flow from the teacher to the students, characterized by behavior such as a lecture or an explanation of course concepts. While some students may not have been socialized as distance learners, all of them assume a "one-down" relationship with the teacher, who is unquestionably "one-up" (p. 23). As a result of the audioconference format, the teacher's dominant role in the communication process is reinforced. Many people, however, recognize that teachers need students as much as students need to be taught, emphasizing the complementary nature of the relationship.

The distance education environment often confounds a person's ability to predict the outcome of his or her messages, and many people report feeling that they sometimes do not communicate well in an audioconference. Teachers and students often have difficulty correcting their mistaken messages, even when they are aware that problems are taking place. In some cases additional communications are necessary to clear up problems, while in other situations one party remains unaware of a miscommunication unless notified about it by a third party.

Audioconferencing has some disadvantages as an instructional communication system. For example, how is a teacher to know whether all the students understand the concepts taught in a particular lesson? There is not enough time during an audioconference for teachers to assess each student's progress. However, if a teacher depends upon students' written work for feedback it usually takes weeks to determine the progress of the entire class, by which time the class has moved on to a different topic.

Many students like the opportunity for one-on-one communication with instructors, and call teachers outside of class for assistance when they need it. However, contacting a teacher is not always easy, especially over a weekend. Students in classes which have only two or three audioconferences a semester tend to telephone their teachers more often than students with weekly audioconferences, though the number of contacts also depended upon such factors as the nature of the subject matter, the difficulty of the course materials, and the clarity of the directions they are given.

Except in rare cases, all of the class discussions are directed by the teacher, which often inhibits student interaction (see Figure 5). While everyone in the class can hear the audio, the opportunity to participate depends upon factors such as who the teacher calls on to speak, the audio fidelity, the environmental conditions at different sites, cultural habits, and students' individual characteristics. In Figure 5, for example, Student c must go through the teacher to communicate with Student b or any other student.

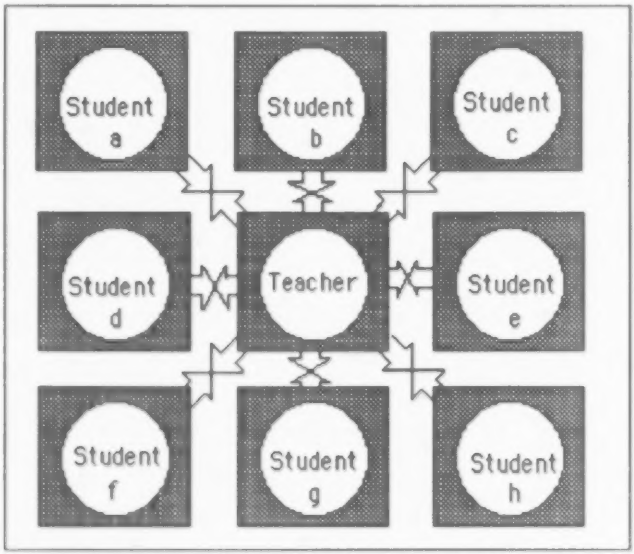

Figure 5. Discussion patterns heard in an audioconference class.

Several patterns of miscommunication have been identified by audioconference participants although they are frequently unaware why they have miscommunicated. Distance learners are just as likely to miscommunicate as people taking on-campus

courses, but face additional problems because they have fewer opportunities to correct missed messages. Some of the most commonly cited communication problems are blindering, bypassing, indiscrimination, and allness (Haney, 1979).

Blindering. Teachers usually know what to expect from a traditional school environment, but when it comes to preparing for distance education classes some of them approach the process with "blinders" on. Their anticipation of audioconferencing is hampered by their previous experiences in traditional classrooms, and their "blindering" behavior sometimes bewilders students (Haney, 1979).

The first audioconference course for one teacher turned out to be a disaster. The course had never been taught over the audioconference before and while the teacher received extra pay, there was little time to research and develop the most effective way to offer the course. The teacher assumed that instructing students over the audioconference was futile, and limited the class meetings to question and answer sessions.

The students found the teacher's assumptions about the course changed little over the semester, even after receiving a great deal of negative feedback. The students at one site came to rely on a university-paid tutor who lived in the village and ignored the teacher.

The teacher, however, viewed the decision not to lecture as being "practical" about the instructional medium, and believed that students felt the same way about the futility of audioconfer-

encing. As the class continued the teacher became increasingly frustrated by the process, but did not change the instructional format of the course. The amount of time needed to correct student assignments was so overwhelming that the teacher eventually had to hire an graduate assistant to grade homework.

Many audioconference students are just as likely as teachers to wear blinders. Students are socialized by traditional public schooling, and occasionally they have trouble changing some of their perceptions about the educational process. One problem that some teachers notice is that many students have trouble pacing themselves through a course. Mr. Y. observes the following:

> Most students are used to spending thirty hours a week in the high school and maybe twelve hours a week doing homework. Now the situation is reversed and they haven't been able to make the transition yet.

Bypassing. Students and teachers often find that they are "bypassing" one another with their messages. Although they think they understand what they hear without any apparent distortion, sometimes the communication goes awry. Bypassing happens when people miss one another's meanings, "when they use the same word to mean different things, or when they use different words to mean the same thing" (Haney, 1979, p. 285). This is not uncommon in audioconference classes because of the differences in participants' background experiences, the lack of common visual cues in the each class environment, and the cross-cultural differences which characterize most of the university's cross-regional courses. Ms. V. points out that non-Native people frequently use negatives in their speech. Native students on the other hand express themselves differently.

> You hear questions like "You didn't go to the store yesterday?" If you did not go, you [non-Native] would say "no." A Native person would say "yes," meaning "yes–I did not go to the store."

Another cross-cultural factor which Ms. V. believes contributed to bypassing is the meaning that English and Yup'ik speakers attribute to stressed words. English speakers can change the meaning of a message by stressing one word within a sentence. For example, in the sentence, "How many did you buy?" placing the emphasis on different words alters the meaning of the question. For Yup'ik speakers, however, stressed words only mean a difference in dialects between speakers. Ms. V. remarks that "I've seen *gussak* teachers stress words and the meaning went right over the student's head."

Social and cultural differences are often exacerbated by using subject area jargon. One student, Ms. P, became confused in an education course when the teacher spoke about "nativism" in the context of the history of American education. "Any time I heard 'nativism' I thought of us Alaska Natives, not *gussaks* in the Lower 48. I got very confused."

Bypassing is hard to detect over the audioconference because it is difficult for communicators to assess how their messages are being received. In many cases the results of the miscommunication are only evident in written assignments received days after the initial exchange and it is often too late to correct the errant communication.

Indiscrimination. As adult learners, students bring their maturity and life experiences to the audioconference class. Teachers often have difficulty getting acquainted with distance learners even through activities such as sharing biographies or having students write about their interests. Some teachers admit the tendency towards indiscrimination, "neglecting differences while overemphasizing similarities" (Haney, 1979. p. 387), because they are unable to get to know their students well. Consequently, a few students say that one teacher or another does not always treat them as individuals or as adults. Ms. I. describes a teacher who makes her feel incompetent. Each audioconference the teacher has the class read the text and "underline everything she [feels] is important. Once or twice okay, but every class? We're not children."

Another student, Ms. N., describes a teacher as having lost his patience with the entire class because several students were not responding quickly enough to questions. "[The teacher] said 'I'm not going to waste any more air space' and ended up pulling the plug. [He] didn't even say goodnight." The teacher blamed the entire class for the slow responses of a few students instead of trying to find out why the class is having problems. The nonoffending students felt indignant about their treatment, but had no way to communicate their feelings to the instructor.

Indiscrimination is byproduct of the audioconference environment because teachers are unable to see the differences between students. In some cases, the tendency to view students in categories such as Native, non-Native, urban, rural, developmental, adult learner, and single parent leads to what Haney called

"hardening of the categories" (p. 387). Unless the teacher makes an effort to look beyond stereotypes, miscommunication is inevitable. One educator comments on why she thinks some teachers keep their categories rigid, especially with Native students.

> We need to get human people for audioconference instructors, not the ivory tower professors. Lots of times you get people teaching whose only knowledge of Native people is research, and a lot of what they think they know is wrong. I've heard that comment from both Native and non-Native students.

Some teachers feel that they do not need to know a lot about students as long as they respect them as individuals. Ms. X. remarks that she tries "to conceptualize where the students are and pick up on their clues in class. You just have to be more cautious and accepting."

Allness. Many teachers try to guard against developing an attitude of "allness," the tendency to believe that one knows all that there is to know about something and that what one says "includes all that is important about the subject" (Haney, 1979, p. 339). However, many students still think of their teachers as all-knowing authorities because of their previous experiences in public school.

The belief that teachers know all there is to know about a subject often discourages students' autonomous behavior. The tendency towards "allness" is reinforced by the lack of alternative learning systems within the distance education framework and by the lack of independent activities that would encourage student autonomy. Despite the desire of many teachers to facilitate learning rather than acting as the authoritative source, students

generally rely on the teacher's expertise to create their learning experiences.

Communication and Miscommunication Between Students

The student-to-student transaction is the most underutilized communication pattern in the distance delivery system, although students who are fortunate to audioconference from the same site are able to communicate with each other in person. Additionally, classmates at the same site are often able to study together and offer moral support to one another during the semester. Few patterns of student-to-student miscommunication are readily discernable because of the infrequency of direct contact between students at different sites.

Communication and Miscommunication Between Students and the University

University personnel communicate with students through the mail, over the phone, through an advisor, or sometimes through a teacher. The communication usually involves academic advising, course registration, or course withdrawal, in addition to sending and receiving course materials, course grades, and course evaluations. In many cases students are satisfied with the services they receive from the institution, especially in villages which have many support systems. In other cases students are dissatisfied with their treatment as distance learners.

Indiscrimination, or stereotyping, is often a byproduct of the distance between students and the university system. Given the vast area that the off-campus program covers it is not unusual for many students to feel isolated from the university campus. Several students comment that they feel the university does not appreciate them as individuals, nor does it go out of its way to correct some of the serious problems of the distance delivery system. Students cite late arriving materials, poor advising, and the lack of village facilities as evidence that the university does not put a high priority on distance education. The indiscrimination they feel, however, is not entirely the fault of the university's support staff.

Culture and Distance Communication

Much of the research conducted in Alaska over the past twenty years indicates that teachers in interethnic classrooms need to be culturally sensitive to insure that Alaska Native students and other minorities are not lost in the mainstream of public education (Kleinfeld, 1974; Scollon & Scollon, 1980a, 1980b; Sammallahti, 1980; Cotton, 1984; Barnhardt, 1982; VanNess, 1982). The state even requires that all public school teachers needing Type A certification or recertification take a class in cross-cultural issues, although university educators are not required to receive similar training. Many of the lessons learned through earlier research are particularly important for audioconferencing, especially because the communication process is restricted to the audio channel. While most teachers try to operate in a culturally-sensitive manner, it is difficult to use many of the kinds of

activities that can facilitate interethnic communication. In fact, many miscommunications caused by cultural differences may not even be noticed or acknowledged during the semester.

One of the most frequent concerns of distance educators is whether the course curriculum is appropriate for an interethnic class. Is there a body of knowledge that everyone ought to know, or should courses be directed at the needs and concerns of rural students? Since cross-regional courses contain several different populations, how can any course address everyone's need for relevancy? Clearly, the cross-cultural dimension of the distance education system presents unique communication problems, but an overwhelming consensus about how to make audioconferencing more responsive to different cultural imperatives does not exist among either teachers or students. Everyone agrees, however, that making courses relevant for all students is important.

No audioconference classes are offered in an Alaska Native language, although a few faculty are capable of teaching such courses. The university does offer classes with cross-cultural themes, including courses in anthropology, education, Alaska Native languages, linguistics, and psychology. The overall curriculum, however, is devoid of themes which promote the integration of Native perspectives in a unified and consistent manner. While many Alaska Native students speak English as a second or associate language, teaching them is often seen as a developmental problem, rather than one which called for designing more appropriate courses for culturally-different students.

Another well-documented difference between Native and non-Native communication behavior is the amount of time that people pause between sentences (Scollon & Scollon, 1980a). Because Native students pause for a longer time than non-Natives, some teachers misinterpret their silence as nonresponsiveness. Several uncomfortable moments of silence during an audioconference can be unnerving. Mr. W. advises that after asking a question you "wait until you think you can't wait any longer, till you're busting, and then you wait some more." Counting to ten silently will accomplish the same thing. If students feel pressured to respond quickly to questions, they often decline to participate during the rest of the audioconference. It is up to the teacher to make sure that each student has many chances to participate successfully in the class. The majority of students feel that teachers give them enough time to speak, although there are occasional lapses even by the most experienced educators.

Empowerment of the Learner

Off-campus programs are designed to help empower students to take control of their own education, however, audioconference students have little input into their learning environment. Few instructors make student autonomy a feature of their courses, and while it seems that the system would foster students' independent study habits and individual initiative, the distance delivery program actually tends to reinforce their dependence upon the teacher. According to Mr. Y., student autonomy is often hampered by previous experiences.

> Yes, some of the students are extremely bright, but I've only run across one or two who can write correctly. That's both on and off campus. You have to give students a lot of direction and concept-building exercises. They simply don't have the conceptual background to take technical courses like biology and chemistry.

The cognitive strategies that are identified by researchers as important to student learning are also difficult to foster over the audioconference (Flavell, 1976; Witkin et al., 1977; Nickerson, 1986; Atman, 1987; Bååth, 1980, 1984) and the distance delivery format makes it hard for teachers to model learning strategies for students. Characteristics such as time-management skills, goal-

setting, memory-enhancing techniques, relating information to prior knowledge, pattern-recognition, and striving are hard for teachers to explain or teach and still cover the course curriculum. Furthermore, students do not have the speedy feedback they need from their teachers so they can monitor their own learning progress.

The ideal of the autonomous motivated student working independently may have a cultural bias because many Native students report that they are more comfortable working within a group or a community format. Many students develop autonomous behavior within a social group context rather than being apart from others, and several of them mention that they are glad to be part of an audioconference class instead of working in the correspondence mode. Teachers who build collaborative assignments into their courses report a high degree of success and student satisfaction with their effort.

In sum, one of the goals of the off-campus program is to empower rural students in the same way as the placement of high schools in rural villages empowered communities to exercise control over their children's education. The distance delivery program, however, is directed by the university system and its branch campuses, with minimal input from rural constituents. Audioconferencing tends to discourage the empowerment of most learners due to the limits of the telecommunications technology, the lack of alternative learning systems, and the unequal distribution of learning resources in rural villages.

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Appendix A

Teaching Strategies for Improving Audioconference-Based Instruction

1. Distance educators should systematically share information with each other. Although teachers use many successful instructional strategies most educators remain ignorant of their colleagues' practices.

2. Teachers should gear out-of-class activities to practical experiences and encourage students to interact with their families, friends, and neighbors as part of their homework. Field-based experiences will incorporate students' social, cultural, and environmental contexts into distance education courses.

3. Whenever possible, teachers should use locally-appropriate and culturally relevant examples for concept development.

4. Teachers should look for ways to encourage interaction among students at different sites.

5. Where appropriate, students should be given the option of creating and carrying out their own homework assignments.

6. Teachers should encourage students to relate homework assignments to current or previous coursework.

7. Before each semester, audioconference teachers should collaborate to develop homework assignments that meet the requirements for more than one course.

8. Teachers should provide as many different feedback opportunities for off-campus students as possible.

9. Teachers should include a communication component in their courses to alert students to possible audioconference communications problems; effective communication practices should be stressed, and a respect for cross-cultural perspectives should be cultivated.

10. Audioconference class outlines and course information should be accessible through a computer network. Data should include information about course assignments, textbooks, frequently-used handouts, and successful teaching methods.

11. Audioconference teachers, in concert with administration and support services, should develop an off-campus resource database. The database should be accessible through the university computer network.

12. A developmental education focus, particularly with writing skills, should be a feature of all audioconference courses.

13. A database about Alaska Native cultures should be collected, maintained and accessible through a computer network .

14. Distance educators should be encouraged to team teach selected courses so that students can get alternative views on different academic subjects. Team teaching would be a way to stimulate a student's ability to synthesize information from different disciplines and to evaluate facts from competing perspectives.

Appendix B

Administrative Strategies for Improving Audioconference-Based Instruction

1. A current hearing test should be required as part of the health screening for new audioconference students. For students already in the system, a hearing test might be part of a presemester audioconference.

2. University administrators, in conjunction with teachers and support staff, should develop a model for the development and delivery of distance education courses. Systemwide models are needed because regional campuses are offering cross-regional courses, and students are ill-served by a lack of coordination among rural campuses. The system should be designed for the unique conditions of the rural environment and would most likely involve the assistance and cooperation of other statewide agencies, especially rural school districts.

3. One of the underlying assumptions of the distance delivery system should be that no one technology or combination of technologies is the ultimate solution for all rural education. Instead, several technological alternatives should be developed and utilized in appropriate contexts and updated as new means of delivery become available. A second underlying assumption of the system should be that instruction will be geared for an interethnic audience.

4. Figure 6 represents a model for the development of university distance education courses. The first step in converting to a systematic approach is to conduct a needs assessment of rural communities. The results of the assessment should be checked and eventually lead to the purchase and installation of new technology, the design of additional courses, and, if necessary, the redesign or deletion of existing courses. Most courses would be part of existing degree programs, but others could be created to fulfill local needs for context-specific instruction.

Courses should follow consistent themes such as the integration of information between appropriate courses and the use of locally-appropriate examples to illustrate concepts. Concurrently, individual courses would be designed for a variety of instructional formats, with both existing technologies and future technologies in mind.

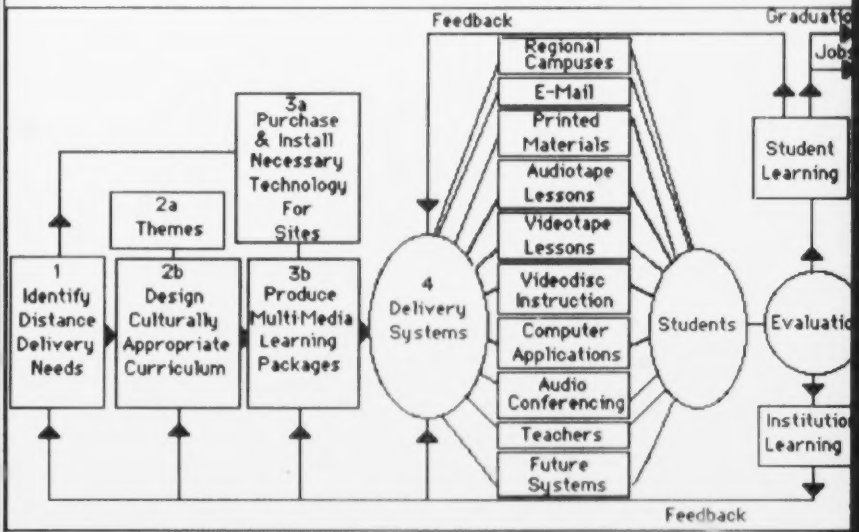

Figure 6. *Proposed development of courses for distance delivery. Adapted from* Distance Education: The STOU Approach *(p. 16) by W. Srisa-an, 1986, Bangkok, Thailand: Sukothai Thammathirat Open University Press. Adapted by permission.*

5. Course outlines and materials should be accessible through on-line databases. Instructional technologies such as printed materials, audiocassettes, videotapes, videodiscs, computers, e-mail capability, and audioconferencing are available at some sites, and a needs assessment should point to additional media purchases which can augment the technologies that are already in place. The advent of desktop publishing makes the local production of distance education materials a logical step because of the difficulty of obtaining suitable Alaska-specific copyrighted materials.

6. Teachers should be given more release time to develop distance education courses and have incentives for doing so. Working over summer vacations, for example, would allow full-time faculty to team with other faculty or with an instructional developer to improve existing courses or to design new distance delivery courses. Since the production of materials for distance education usually requires more time and technical expertise than similar work for on-campus courses, teachers will need a longer lead time to prepare a course for off-campus delivery.

7. Administrators should work together with student support services to identify and provide electronic data transfer capability for village students. In many cases cooperative agreements must be negotiated with agencies such as school districts and local government to allow students to use nonuniversity equipment such as computers, videotape players, and facsimile machines.

8. Minority students should be encouraged to become university teachers, administrators, and support personnel.

9. The university should provide comprehensive statistics on distance education courses and distance learners. The lack of a statistical database has made it difficult to conduct an effective evaluation of distance education programs.

10. A comprehensive survey of the distance education population should be conducted to find out the demographic and social characteristics of the current off-campus population. This information will help in program planning and course development for cross-regional courses.

11. A series of videotapes should be produced for training existing and future employees in areas such as cross-cultural communications, student support services, simple maintenance and repair of audioconference equipment, distance education communication and miscommunication, teaching distance education courses, and other areas with ongoing training needs.

12. Student identification cards should be provided for rural students. While identification cards alone are not enough to alleviate students' feelings of isolation, the issuance of IDs would reaffirm the university's commitment to off-campus students.

13. Because a significant number of rural students are second-language learners, campuses with large enrollments of Native students should offer some audioconference courses with an Alaska Native language as the primary language, provided there is a qualified instructor. Classes in education, history, and anthropology would be likely candidates for Native-language or bilingual courses.

14. A telephone tutoring system should be set up for villages without on-site tutors. Since distance teachers are usually reached on a hit-or-miss basis, providing students with a list of subject-matter experts or trained tutors will enable them to call someone knowledgeable if they need help with their coursework.

Appendix C

Support Strategies for Improving Audioconferenced-Based Instruction

1. All materials for rural sites should be proofread before distribution.

2. A Distant Learner Student Organization (DLSO) should be set up. The off-campus student body could elect regional chairpersons who would coordinate the gathering of information in their region. The university should provide additional resources for the DLSO to publish a monthly newsletter covering the off-campus service regions. The publication would serve as a focal point for regional and cross-regional distance education concerns. Each region would have its own editor who would be responsible for reporting news and opinions. The newsletter would also serve to educate the off-campus student body about critical issues and it could mobilize student opinion when distance education issues are being decided on campus.

3. Updated class lists should be available for all distance learners during the first week of a semester so they can keep track of the other students in the class. Class lists should include addresses and phone numbers to facilitate students contacting each other.

4. Off-campus advising procedures need to be evaluated and standardized, perhaps through the use of a computer program that would assist counselors, students, and teachers to easily pinpoint students' academic options.

5. Vocational and psychological counseling services should be available for all distance education students. If the university cannot provide these services directly, it should be able to direct students to an appropriate agency for help.

Appendix D

The Yugtarvik Museum Project: Using Interactive Multimedia for Cross-Cultural Distance Education in Alaska

(Reprinted by permission from *Academic Computing*)

Barry Sponder and Dennis Schall

University of Alaska Fairbanks

Overview

Recent developments in the education of Alaska Native students have been driven by cultural, social, and economic forces first awakened by the building of the trans-Alaska pipeline during the 1970s. Despite the best efforts of western educational institutions, on-campus and off-campus programs for Native students have lacked both cultural and environmental relevance. To address these shortcomings several teachers and students at the University of Alaska Fairbanks Kuskokwim Campus have developed an interactive Macintosh/videodisc program utilizing the exhibits of the Yugtarvik Eskimo Museum in Bethel, Alaska. The program is used in an on-campus teacher preparation program and as part of the distance delivery of college courses to rural areas of the state.

One of the most often-overlooked strengths of computer technology is the nearly unlimited number of applications available to people of different cultures. From Thailand to Saudi Arabia, Nepal to Nigeria, computers speak Arabic, display Sanskrit characters, control irrigation canals in Bali, and teach people about an ancient Chinese emperor who lived 2,000 years ago (Chen, 1989). While people worldwide are using computers for their own purposes, and often in their own languages, many minority cultures in the United States, such as Alaska Natives, have been slow to benefit from the extraordinary power that computer technology offers.

At the University of Alaska Fairbanks Kuskokwim Campus we have successfully transformed the Apple Macintosh into a *Yup'ik Eskimo computer* that is programmed by Native students, controls locally-developed videodiscs, speaks Yup'ik, and teaches many aspects of traditional Native culture. Additional Yup'ik computer applications are being prepared for placement in rural Alaskan villages to augment college courses that are distance delivered from university campuses throughout the state.

Perhaps the greatest accomplishment of this project is that it exists at all. It has been a challenge to overcome both a lack of funding and an attitude of indifference by several university colleagues and administrators. While many Alaskan educators have called for more culturally-relevant student-directed instruction for Alaska Natives (Barnhardt, 1979), the Yugtarvik Museum Project is the first interactive program specifically designed for Native students. It presents a model for the effective use of instructional technology in Alaska. In addition, the museum project is helping to preserve elements of Yup'ik culture by recording information about Eskimo artifacts that are found throughout Alaska and in museums all over the world. These treasures will be accessible to future generations of Native and non-Native students through the use of the computer/videodisc technology.

The Alaskan Context

When thinking about Alaska, people often focus on larger-than-life images: erupting volcanos spewing clouds of ash that imperil air transportation; huge glaciers guarding the Alaskan shores; endless tracts of uninhabitable land bordered by an oil-rich coastline; whales stranded in the ice in Barrow; an endless stream of oil from the Exxon Valdez nearly destroying the state's fishing industry; the midnight sun illuminating the summer sky; and long winter nights with dancing northern lights. It is clear that the Alaskan context is truly remarkable. Some of the common misconceptions about the state are that Eskimos live in igloos—they don't; that Alaska is all ice and snow—it isn't, we have a thriving agricultural industry; and that the state is isolated from the rest of the country—it's not, in fact in Bethel we receive cable television programs from Detroit!

Alaska, with a land mass equal to a third of the contiguous United States (see Figure 1), has a population of approximately 560,000. The majority of Alaskans live in the three major urban areas of Anchorage (300,000), Fairbanks (35,000), and Juneau (30,000), with the rest of the population (185,000) scattered throughout the state in almost 200 communities, ranging in size from 25 to 5,000 (see Figure 2). Because over eighty-five percent of Alaskan communities are inaccessible by road, including the state capitol of Juneau, satellite technology has enabled Alaska to develop a strong telecommunications infrastructure which unites rural communities with large urban areas. In addition, telecommunications technology allows college courses to be offered to students at remote locations, primarily through the use of audioconferencing which is teaching over the telephone.

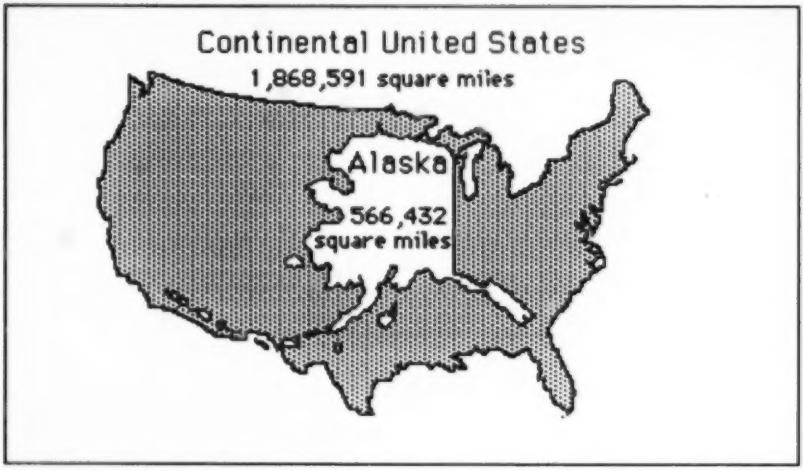

Figure 1. A map of Alaska superimposed over a map of the contiguous 48 states. Alaska formerly covered four time zones.

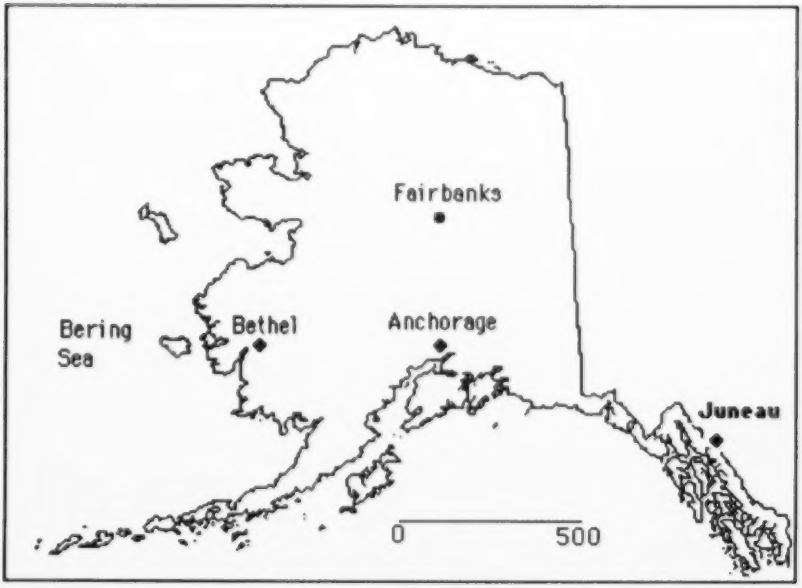

Figure 2. Bethel (population 4,000), Alaska's seventh largest city, is 400 miles west of Anchorage and 40 miles from the Bering Sea. Bethel is the hub of southwestern Alaska and the site of the Yugtarvik Regional Museum and the University of Alaska Fairbanks Kuskokwim Campus.

Alaska Natives

Almost twenty-five percent of rural residents are Alaska Natives. This twenty-five percent represents more than twenty different ethnic groups with unique languages, cultures, and traditional lifestyles. Many Alaska Natives have been fortunate to be isolated from urban areas and have kept much of their culture intact, although the dominant society regularly intrudes on traditional values in the name of modernization. The effects of acculturation on Alaska Natives have often been devastating, resulting in chronic alcoholism, suicide, and the erosion of traditional Native values (Alaska Federation of Natives, 1989).

Western Education for Alaska Natives

From the first schools operated by Russian missionaries to the current state operated school system, education for Alaska Natives has usually meant westernization and alienation from their cultural identity (Collier, Jr., 1973). Only recently have Alaskan educators focused on developing culturally-relevant programs for Native students through government-mandated bilingual education and locally designed cross-cultural programs. However, these innovations have yet to make a difference in the overall achievement of Alaska Native students. "Native children enter and exit village schools with serious educational handicaps and their education is worse than mediocre" (Alaska Federation of Natives, 1989). Less than four percent of the Alaska Natives who finish high school graduate from college compared to twenty-four percent of the overall Alaskan population, a statistic which underscores Native students' lack of success the further they try to travel up the education ladder (Kleinfeld, Gorsuch, & Kerr, 1988).

Oil Is Well in Rural Alaska

The Alaska Native Claims Settlement Act (ANCSA) of 1971 resolved Native land claims against the federal government and permitted the building of the trans-Alaska pipeline (1974), which fueled an unprecedented ten-year economic boom for the state. However, ANCSA and the trans-Alaska pipeline have had the most impact on the economics, politics, lifestyles, education, and cultural identity of Native groups. In the early 1970s Native villages won significant court battles to receive educational services equal to those of large urban areas and forced the state government to build schools in small villages throughout the state. Rural Alaskans also had enough political clout to force the creation of regional college campuses to offer on-site and off-campus courses for students who wanted to earn a college degree while living in isolated rural villages.

Native Teachers for Native Students

Many educators feel that the empowerment of Alaska Natives will be facilitated by having more certificated Native teachers in rural classrooms. To accomplish this goal the University of Alaska Fairbanks created an innovative teacher education program in 1971 that allowed Native students to earn a teacher education degree in their villages. The program is delivered to rural students through a combination of audioconferencing, site visits by teachers, and field-based experiences in rural Alaskan schools. Despite the limited success of the program, almost eighty-five percent of Alaskan teachers are trained and hired from outside the state while less than three percent of all classroom teachers are Alaska Natives.

Distance Education in Alaska

The development of telecommunications-based distance education programs in Alaska was fueled by the 1975–1985 oil boom. Off-campus college programs were created with many of the same limitations that hampered on-campus courses. Most courses had little or no cross-cultural relevancy and most materials were developed outside of Alaska. Little attention was given to providing students with different learning alternatives, because distance education meant either correspondence courses or audio-conferencing over the telephone. Neither format was successful in giving students the interactive multimedia experiences that many educators saw as one part of the solution for improving the performance of Alaska Native students (Barnhardt,1979).

A Foundation for Interactive Learning

Responding to the call for more culturally-relevant interactive programs, faculty at the University of Alaska Fairbanks Kuskokwim Campus explored the use of computer applications for teacher education and distance delivery courses. We wanted to help students learn to use the computer and associated technologies to meet their own educational goals in an exciting and culturally-appropriate way. If students were able to control the media, they could effectively enhance their own learning behavior. Students in distance education courses would be less dependent on learning over the telephone and more likely to become self-learners through an on-site interactive multimedia system. The theme for the interactive learning system was the Bethel Yugtarvik Museum and its exhibits. With faculty assistance, Alaska Native and non-Native college students designed and programmed *Hypercard* presentations about the Yugtarvik museum exhibits and many other elements of Yup'ik Eskimo culture.

Hypercard

A promising tool for developing Alaska-specific materials turned out to be Apple's *Hypercard* program which is included with every new Macintosh computer. The program has enabled thousands of Macintosh users to develop their own simple *Hypercard* stacks of information, many in foreign languages as diverse as Russian and Chinese. Programming *Hypercard* is not difficult because it builds on the graphic interface of the Macintosh itself. *Hypercard* represents a series of index cards on a computer screen that can be manipulated and programmed in many creative ways with a minimal amount of technical knowledge. It has simple programmable buttons that can link cards together, create animation, or play sounds. *Hypercard* makes the computer a powerful open-ended tool because the user no longer needs to know complex computer languages to make the computer perform. *Hypercard* is extraordinary because it makes programming the computer a relatively simple process.

Hypercard appeared to be an ideal tool for prospective teachers. People who could program *Hypercard* applications for their classroom and teach their students to use them would bring something unique to rural Alaskan villages. Kuskokwim Campus has many teacher education students and there are scores of teachers in Bethel, so we started offering *Hypercard* courses for educators.

Hypercard for Distance Education

Hypercard also appeared to be an ideal way to offer additional instructional materials for students in distance education courses. Teachers could prepare lessons on *Hypercard* to cover important concepts using Alaska-specific examples instead of relying on materials developed in the

lower-48 states. For example, a freshman biology course could include a series of *Hypercard* presentations of basic science concepts, such as diffusion, cell structure, and basic anatomy, which are necessary for a fundamental understanding of other scientific concepts. The *Hypercard* lessons would illustrate universal concepts with locally-relevant examples. Students could then be free to use the computer and review the concepts as often as they needed for comprehension.

An Early *Hypercard* Program

Our first use of *Hypercard* was to develop a simple program of cultural concepts to support an on-campus introductory Yup'ik language course. The course uses an oral approach for teaching Yup'ik through actions and commands. This method has helped the course go from the least-popular on campus to one of the most popular we offer. Unfortunately, there was little reinforcement for course concepts except through audiotapes, which are often difficult to follow. One student who was enrolled in the course remarked that he'd like to see the language concepts reinforced in another way. Bingo! Over the next few weeks we developed a demonstration *Hypercard* program that presented simple language lessons such as "Kitchen Concepts" and "Transportation." We even added a section about the stranded Barrow whales since they had received so much worldwide attention. We also added sound to the *Hypercard* stack with the *MacRecorder* program, which uses an external microphone and computer program that makes it easy to put sound into the *Hypercard* program. When we demonstrated our program to students they were very excited about using it (see Figure 3).

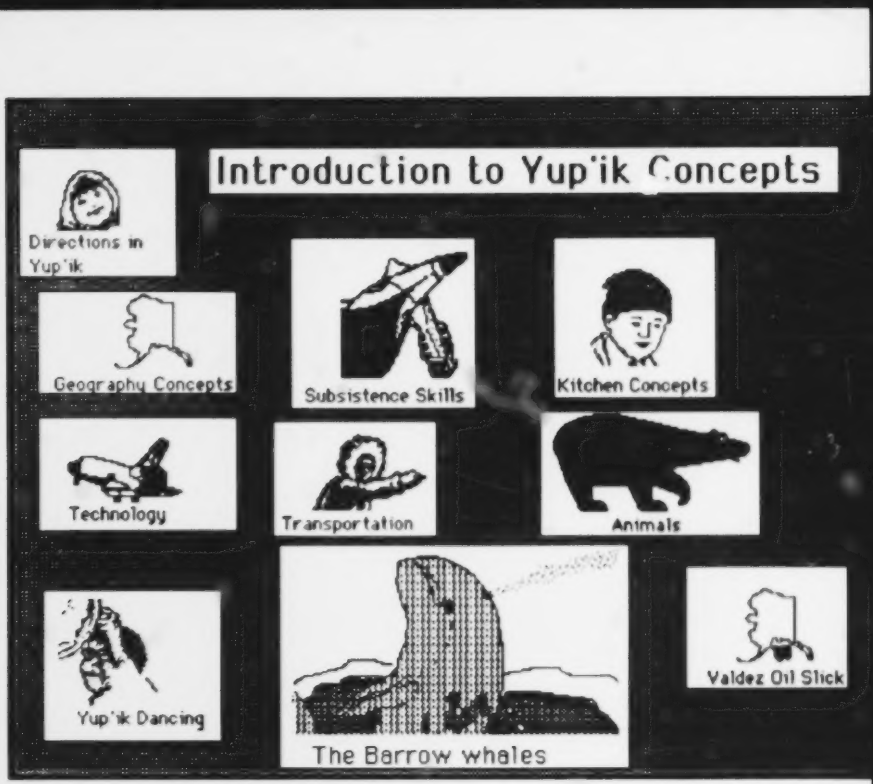

Figure 3. *The main menu of the Introduction to Yup'ik Concepts program.*

Interactive Media

Hypercard is also useful as a part of an interactive multimedia system which utilizes a computer connected to an ancillary device such as a videotape or videodisc player. Older Macintosh models such as the Mac Plus and the Mac SE are unable to display videodisc output on their screens, so a second monitor is needed for the interactive system. Other computers such as the Apple IIGS, the IBM-compatible, and the Amiga can display videodisc images on the computer screen, although their *Hypercard*-style programs are not as easy to use as the Macintosh version. Applications for all these computers are currently being developed at the Kuskokwim Campus.

Videodiscs are capable of storing huge amounts of visual data, 54,000 frames of information on each side of a two-sided disc, which can be one-half hour of continuous motion video, thousands of slide pictures, or any combination of the two. Access time for any individual videodisc frame is usually between 1.5 and 3 seconds, depending on the brand of videodisc player. While there are hundreds of commercially-developed videodiscs on the market, we knew that we would eventually have to develop our own Alaska-specific videodisc to accompany our *Hypercard* program.

Another advantage of videodisc technology is its dual audio track. Each track can carry a separate narration sequence which makes the videodisc a perfect tool for bilingual audiences. The videodisc we designed would carry both English and Yup'ik language audio tracks, enabling the presentation to reach the widest possible audience in western Alaska.

The Yugtarvik Museum Project

The next step in developing a culturally-appropriate interactive program for prospective teachers was to decide on a theme that was flexible and interesting. We decided to use the Bethel Yugtarvik Museum as the focus of the program. The museum is a rustic place, housed in an old log cabin with a leaky roof, and filled with many makeshift displays. It has the delicious aroma of dried salmon mixed with the scent of tanned fur and basket grass. The building itself is less than 700 square feet and it is crammed full of artifacts such as baskets, parkas, mukluks, masks, drums, ivory and kayaks. Some of the displays have small information cards, but many displays have only titles. There is also a little gift shop which sells crafts by local artisans and offers a small selection of books about Eskimos and other Alaska Natives. Most visitors to Bethel manage to see the museum, but usually stay

less than an hour because there is not much information available about the crafts on display. We believed that it would be exciting to put the information about the museum on *Hypercard* so that people would be able to learn about many other facets of Yup'ik Eskimo culture.

Other possible uses for the project quickly came to mind, such as making a videodisc of the museum's artifacts and obtaining pictures of objects from other museums around the country. The addition of materials from other museums would enhance the Yugtarvik collection and expand the museum's capabilities to educate. We wanted to place the system in rural village schools and have teachers use the program in the Foxfire tradition. Students could interview their parents and elders and then include the information about their cultural heritage, with pictures, in a *Hypercard* stack. We could teach our pre-service and in-service teachers to use *Hypercard* and they could reprogram the *Hypercard*/videodisc system to fit their own village context. We could also use similar interactive systems to support our distance education audioconference courses.

The Videodisc

Developing interest in the project among our university colleagues was difficult. We ran into the brick wall of "that's nice, get a grant." It seemed as though a project was only worthwhile if someone else offered to fund it. Additionally, the development of an educational product was not considered a legitimate research function in the tradition of a control-group study, correlation research, or the discovery of a new superconductivity material, but rather was seen by many as a clever way to obtain new equipment for the office.

To make a videodisc about the museum we needed to produce a broadcast-quality videotape. Several companies around the country specialized in converting tapes into videodiscs but the cost was more than petty cash would cover. Most companies charged approximately $1,800 to press one side of a master videodisc (one-half hour of continuous video), which could then be used to make other discs. Additional videodiscs were incrementally priced at approximately $30 each for the next 100 discs, to $10 each for the production of 500 additional discs.

We wanted to do our own videotaping and editing and planned to use an Amiga 2000 computer to generate titles and graphics. The Amiga is ideal for producing video overlays because of its unique color and graphics capabilities. It was difficult to get started because we didn't have a 3/4" videotape camera, proper editing equipment, or funding to pay for the videotape production. As university professors we had our courses to teach, and the tremendous amount of time needed to develop an interactive project did not seem to fit the research portion of our workload. We applied for university grants to get the project going but were turned down because the university would not purchase equipment for outside entities such as the Yugtarvik Museum.

Fortunately, we found there were some people in Anchorage using the Amiga computer for interactive displays and we contacted one of them, Terry LaGrone of Flight Training Devices–Alaska. Terry made a big contribution to interactive programming by developing the PILOT language for the Amiga which enabled the computer to create interactive displays using only one monitor—a distinct advantage over the Macintosh. We spent time discussing the various strengths of the Macintosh versus the Amiga for interactive multimedia applications. We recounted our plans to eventually

place images of the Yugtarvik Regional Museum's collection on a *Hypercard* stack with a videodisc component. Terry preferred the Amiga because it could do the job with only one screen, even though it didn't have attractive features of *Hypercard*. However, we ultimately decided that the graphics, sound, and easy programmability of *Hypercard* were hard to beat, especially since a *Hypercard* program could be used alone if a student did not have access to a videodisc player.

Weeks later we received a surprise offer from Flight Training Devices–Alaska. They were producing a commercial videodisc as part of an interactive display for tourists at the Anchorage International Airport. They planned to sell advertising space to enterprises such as restaurants, vacation lodges, hotels, ski resorts, tour guides, and other local businesses. Interactive displays can present a variety of information in a short time and have proven very successful in other locations. Approximately five minutes of unused time remained on the videodisc and Terry thought that video from the museum would help to demonstrate additional capabilities of interactive video. He offered us free time on the videodisc—all we had to do was supply five minutes of finished videotape. That was an eternity! We had the option of filling five minutes of videodisc space with thousands of slides of Yup'ik crafts or combining several seconds of short motion segments with slides. Well, sweat equity wasn't so bad, and we didn't need a grant to get the project started.

Education 429

The *Hypercard* portion of the program proved easy to develop. We were offering a course in using computers in schools, Education 429, and decided to use the Yugtarvik Museum as the focus of the course. The development of the museum *Hypercard* program became a course project. Students in the class immediately saw the value of the undertaking and were enthusiastic about developing a Yup'ik computer application. Ten students enrolled in the course, most of whom were Yup'ik. Two employees of the museum were in the class and they provided much of the cultural expertise that the other students needed.

All of the course objectives were met while students developed their own *Hypercard* stacks based upon their interest in one or more of the museum's displays. Topics included fish-skin boots, ivory carving, basket making, traditional medicine, doll making, mask making, parkas, and miscellaneous topics (see Figure 4). One student used a database program to begin compiling a record of the museum's contents. Students worked on their projects individually and as part of a design team. They learned the principles of visual presentation and how to design instructional displays for the classroom. They practiced writing for different audiences since the museum was likely to get visits from tourists, college students, and schoolchildren, as well as from elders who had little formal schooling and preferred to speak Yup'ik. Students also critiqued each other's work and helped one another polish up their grammar. Many of the students spoke English as their second language and profited from the project-based approach to writing.

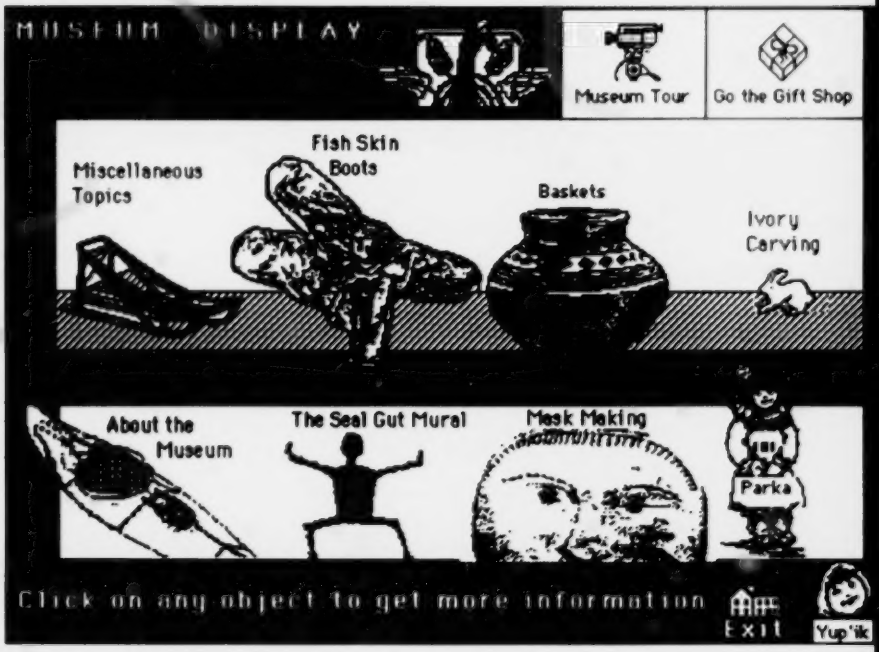

Figure 4. *The main menu of the Yugtarvik Museum Program.*

We ran into issues of censorship and responsibility when one student discovered that her presentation included potentially harmful information—a traditional Eskimo medicine could be used as a hallucinogen. Should she include that fact in the *Hypercard* stack? What if a child learned about this plant through the *Hypercard* program and decided to use the easily available herb to get high? What was our responsibility in the matter? The class had a heated discussion about whether the information should be included (it wasn't). Other issues proved to be just as sticky but students were able to come to terms with the implications of their choices.

The class context was an important part of the learning experience. Not only did students learn computer applications for the classroom, but they also gained experience in working together cooperatively as a group. The

course curriculum touched many subject areas such as history, biology, language arts, traditional Native culture, and graphic arts on the computer. The class provided students with experiences that reinforced their self-esteem and emphasized the importance of Yup'ik culture and language in the classroom. At the same time the course satisfied the goals of western-oriented education for Native and non-Native students.

We also wanted to include computer animation in the Yugtarvik Museum Project to demonstrate traditional practices such as skin sewing and mask carving. While *Hypercard* permitted very simple animation, the graphics and motion capabilities of *Videoworks II* and *Studio 1* made it possible to include more sophisticated and complex sequences in the *Hypercard* program. Each animation program had certain strengths. *Videoworks II* had better sound capability and permits many more objects to be in motion at one time than did *Studio 1*. However, *Videoworks II* required a separate program, *Videoworks II Hypercard Driver*, to make animations work with *Hypercard*. *Studio 1* provided many of the same effects as *Videoworks II*, but didn't need an additional program to operate with *Hypercard*. We decided to use *Videoworks II* for the main display in the museum and scaled back on some of our animation sequences for the version of the program we distributed to Alaskan schools.

The Videodisc

During the summer, after the first phase of the *Hypercard* project was complete, we began to develop our videodisc. We contacted Ted Simmons, a media specialist, who was interested in developing an Alaskan videodisc. He was eager to participate and worked with us after hours and on weekends. His video production expertise and access to professional-quality equipment was necessary for producing our broadcast quality videotape.

Because it was summer, we had enough time to spend several days at the museum videotaping baskets, kayaks, masks, boots, parkas, drums, dolls, and anything else that people had put in their *Hypercard* stacks. Ted knew how to get the best lighting and shot selection for the broadcast-quality video, which a less-experienced camera person might have overlooked. After several days we had over three hours of video that we edited into five minutes of finished tape. Terry Lagrone gave us an early Christmas present when he discovered that his portion of the program proved to be too ambitious and he had only half of the videodisc filled. He offered us the rest of the videodisc space for the our project. We searched through Ted's other videotapes about Yup'ik culture and found several good examples of Yup'ik dancing, sled building, skin sewing, and village travel. We produced fifteen minutes of edited video with graphics and titles added to several segments of the production.

We sent the tape to Terry for final production at *The Videoplex* in Anchorage. *Videoplex* has state-of-the-art computer equipment that can be used for video production, editing, and generating sophisticated computer graphics. Our videotape was combined with the commercial segment into a half-hour mastertape which was sent to Philips & Dupont Optical Company in Wilmington, Delaware, for pressing into a finished videodisc.

The Results

Several weeks passed before we received a finished copy of the videodisc. The disc worked smoothly with the *Hypercard* application, and we were amazed at how easily the two technologies interfaced. We used the commercial *Hypercard* application *Voyager Videostack*, with its many predefined programming functions, to interface the Yugtarvik Museum program with the videodisc.

We connected a Mac Plus computer to a *Pioneer 4200* videodisc player. The *Pioneer 4200* is capable of generating overlay text on the monitor over the videodisc picture, which allowed us to customize the program to fit different audiences. For example, one button on a card about baskets was programmed to display text for elementary school students, while pressing another button on the card presented information about the same basket for a college audience. Clicking on a third button displayed the information in Yup'ik.

We demonstrated the Yugtarvik Museum Program for our university colleagues, local school districts, and professional organizations. All of the audiences were very enthusiastic and envisioned their own uses for this system. The power that interactive multimedia portends is often overwhelming, and people have come to us for help in starting their own projects. For example, the Alaska Energy Authority has expressed interest in having us design a training system for the repair of rural village power plants. Many of these plants lack proper maintenance and an interactive system placed in a village could be a good maintenance and troubleshooting tool to replace the ponderous, hard to understand technical manual.

We recently received a United States Department of Education grant to develop a videodisc presenting universal science concepts using the Yup'ik Eskimo context to teach general biology to nursing students in western Alaska. This system, a direct spin-off of the Yugtarvik Museum Project, will be used for both on-campus and distance delivery courses.

Problems

A major obstacle that hinders the development of a project such as this one is the traditional view of research and education which university educators and administrators have. "The purpose of educational research is not to develop new products, but rather to discover new knowledge [through basic research] or to answer specific questions about practical problems [through applied research]" (Borg & Gall, 1983). Other forms of research such as educational product development tend to fall outside of these narrow parameters and consequently have little credibility in traditional circles. However, "educational research and development . . . appear to be the most promising [strategies] we now have for improving education . . . because [they develop a product] in the setting where it will be [eventually] used." Changing the attitudes of university-trained professionals has proven more difficult than developing the actual product.

Future Uses

The future of programs such as the Yugtarvik Museum Project is directly related to the willingness of educators to recognize the possibilities available through constantly changing technologies. The interactive videodisc presentation can be transmitted over the telephone line for simultaneous broadcasting at many different locations. Such a system could enhance distance-delivered education since students would be able both to receive an expert presentation of material and then work with the materials at their own pace outside of class.

The Alaska Civil Air Patrol is considering the development of an interactive system which would visually display the perilous landing conditions at rural village airports and provide experienced-based advice on

proper landing procedures. Air fatalities in Alaska are an all-too-common occurrence and if pilots were able to preview unfamiliar landing strips and weather conditions, perhaps fewer accidents would take place.

Rural locations served by university-trained village health aides could use an interactive system for diagnosing and treating emergency illnesses and accidents. Because many isolated villages are unapproachable during inclement weather or during spring breakup, and because telecommunications are always subject to failure, adequate health care becomes a primary concern of rural Alaskans.

Conclusion

The Yugtarvik Museum Project has demonstrated that interactive media can be successfully adapted to meet the educational goals of culturally-relevant instruction and standard course objectives. The greatest obstacle to developing educational products such as this one are the attitudes of many university educators and administrators about the legitimacy of technological research. With the proper support university faculty can make a valuable contribution to the growing body of research about the effectiveness of different kinds mediated instruction, and they can continue to develop products for classroom use.

While developing programs for Alaska Native students has proven to be both motivating and challenging, teaching students to develop their own multimedia applications has been the most important benefit of the Yugtarvik Museum Project. In the future, students should be able to control more of their learning through the growing availability of *Hypercard*-style applications for all computers and through other technologies such as CD-ROM, digital audiotape, and videodisc.

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